

Women's Issues in Water and Sanitation

Attempts to Address an Age-Old Challenge

Proceedings Series



The International Development Research Centre is a public corporation created by the Parliament of Canada in 1970 to support research designed to adapt science and technology to the needs of developing countries. The Centre's activity is concentrated in five sectors: agriculture, food and nutrition sciences; health sciences; information sciences; social sciences; and communications. IDRC is financed solely by the Parliament of Canada; its policies, however, are set by an international Board of Governors. The Centre's headquarters are in Ottawa, Canada. Regional offices are located in Africa, Asia, Latin America, and the Middle East.

© International Development Research Centre 1985
 Postal Address: Box 8500, Ottawa, Canada K1G 3H9
 Head Office: 60 Queen Street, Ottawa, Canada

Kabalikat ng Pamilyang Pilipino, Makati, Manila PH
 IDRC, Ottawa CA

IDRC-236e

Women's Issues in Water and Sanitation : attempts to address an age-old challenge. Ottawa, Ont., IDRC, 1985. 104 p.

/Women/, /water supply/, /sanitation/, /social participation/, /community development/, /developing countries/ - /appropriate technology/, /pumps/, /maintenance and repair/, /life styles/, /health education/, /income/, /development projects/, /conference report/, /list of participants/.

UDC: 396:628.1

ISBN: 0-88936-437-0

Microfiche edition available

Il existe également une édition française de cette publication

La edición española de esta publicación también se encuentra disponible

Women's Issues in Water and Sanitation

Attempts to Address an Age-Old Challenge

Organized by
Kabalikat ng Pamilyang Pilipino, Philippines
in collaboration with the
International Development Research Centre, Canada

Abstract

A seminar on "Women's Issues in Water and Sanitation" was held in Manila, Philippines, 24-26 September 1984 to discuss the problems and constraints that have limited women's participation in water and sanitation activities in the past and identify ways in which their roles can be enhanced in the future.

This publication documents the results of the seminar by reviewing women's past efforts in water supply and sanitation activities and presenting abstracts of papers about ongoing research. In addition, the 62 representatives from Africa, Latin America, Middle East, and Asia were divided into four working groups and asked to develop ideas for future research. These preliminary proposals are also presented in the form of "project leads."

Résumé

Un colloque ayant pour thème "le rôle des femmes dans le domaine de l'approvisionnement en eau et des services d'hygiène," a eu lieu du 24 au 26 septembre 1984, à Manille, aux Philippines, afin de discuter des obstacles qui, dans le passé, ont entravé la participation des femmes aux activités intéressant ce domaine, et de trouver des moyens d'accroître leur rôle.

Cette publication présente les résultats du colloque. Elle revoit la participation des femmes aux activités d'approvisionnement en eau et d'hygiène et présente des résumés de rapports sur les recherches en cours. Durant ce colloque, les 62 représentants d'Afrique, d'Amérique latine, du Moyen-Orient et d'Asie ont été répartis en quatre groupes de travail dans le but de trouver des sujets de recherches futures. Ces sujets provisoires sont également présentés sous forme "d'idées de projet," et constituent le premier pas vers l'élaboration d'un projet.

Resumen

Des 24 al 26 de septiembre de 1984 tuvo lugar en Manila, Filipinas, un seminario dedicado al tema "Aspectos Relacionados con la Participación de las Mujeres en las Actividades de Agua y Saneamiento," convocado para discutir los problemas que han limitado tal participación en el pasado y encontrar formas de expandirla en el futuro.

Esta publicación documenta los resultados del seminario, reseñando los esfuerzos pasados de las mujeres en este campo y presentando resúmenes de los trabajos sobre investigaciones en curso. Durante el seminario, las 62 representantes de Africa, América Latina, el Medio Oriente y Asia fueron divididas en cuatro grupos de trabajo con el ánimo de identificar futuros temas de investigación. Estas propuestas preliminares aparecen en la forma de "ideas para proyectos" (project leads).

CONTENTS

Foreword 5

Acknowledgments 7

Preface 9

Introduction 11

**Women, Water, and Sanitation: Issues,
Questions, and Prospects 11**

Project Leads 18

Women and Health Education 20

Women and Income Generation 32

**Women and the Repair and Maintenance of
Water and Sanitation Technology 42**

Women and Technology 55

Conclusions 65

Abstracts of Papers 68

**Women's Role in Water Supply, Sanitation,
and Environmental Control (Brazil) 68**

**Role of Women in Having Safe Water and
Promoting Sanitation (Egypt) 69**

**Women, Water, and Sanitation: The Dian Desa
Experience (Indonesia) 70**

Women's Role in Water and Sanitation (Peru) 71

**The Surigao City Mothers Club: A Model in
Community Development (Philippines) 72**

**The role of Women in the Control of Soil-
Transmitted Helminths (Indonesia) 73**

**Schistosomiasis Control Through Primary
Health Care: MWEA Irrigation Scheme
Experience (Kenya) 75**

**The Villager's Manual on the Installation,
Repair, and Maintenance of the IDRC-UM
Handpump (Malaysia, Philippines,
Sri Lanka) 76**

**Village Handpumps: A Report on the Initial
Seven Months of Implementation
(Philippines) 78**

Women in Handpump Technology (Sri Lanka) 80

**Women's Participation in Rural Water Supply:
Improving Handpump Technology (Thailand) 81**

Toilet Usage (Philippines) 82

**Solar Disinfection of Drinking Water at
the Household Level (Lebanon) 83**

Appendices 85

**Keynote Address: Women, Water, and Sanitation
Gelia T. Castillo 85**

Participants 99

FOREWORD

In 1980, the General Assembly of the United Nations established the International Drinking Water Supply and Sanitation Decade (1981-1990) to promote the provision of safe drinking water and adequate sanitation for all by the year 1990. That same year, the World Conference of the United Nations Decade for Women adopted a strong resolution that urged member states to promote the full participation of women in the planning, implementation, and application of technology for water supply and sanitation projects.

A review of water supply and sanitation programs indicates that there are few decade activities that have promoted the role of women in either applied research or community development activities. The identification of the problems and constraints that limit women's participation in the decision-making process and the development of strategies that would overcome these constraints are now considered priorities.

To address these issues, the International Development Research Centre (IDRC), Ottawa, Canada, convened a seminar in Manila, Philippines, 24-26 September 1984. During this seminar, strategies on how the roles of women can be further enhanced and maximized in water supply and sanitation activities were discussed and suggestions for concrete programs of action were proposed.

This seminar was organized by Kabalikat ng Pamilyang Pilipino, a local nongovernmental organization (NGO), under the direction of Ms. Cecilia Verzosa (seminar coordinator). The seminar was held in the Philippines as this country has a history of involving women in developmental programs. The seminar's participants, from Africa, Latin America, Middle East, and Asia, have been, are at present, or will be leaders (or managers) of IDRC-supported water supply and sanitation projects. Their areas of interest ranged from

anthropology to environmental engineering. Other participants were selected given their interest in women's issues and for their potential as leaders of research projects.

This publication documents the results of the seminar. It must be pointed out, however, that the proposals identified herein, termed "project leads," are only preliminary ideas, and need further development. Some fall within the realm of technical assistance and have little to do with research per se. Others fail to mention how women would be involved and how their status would be improved as a result of the proposed project. For these reasons, a review panel was established to review each proposal and provide comments on how they could be more clearly focused. This panel included Mary L. Elmendorf and Eddah Gachukia, two IDRC-sponsored consultants who acted as resource persons during the seminar.

Those project leads that have the potential for evolving into research projects will be selected by IDRC for follow-up and possible funding. IDRC's program officers will meet with the researchers to assess their ideas and capabilities and assist them in clearly defining their objectives and in developing a detailed methodology that addresses those objectives. We hope that through our support we will not only contribute to finding appropriate solutions to the problems of development, but will also strengthen the institutions and capabilities of the researchers in these institutions to solve these problems themselves through the process of scientific inquiry.

IDRC is planning to hold a follow-up seminar in about 3 years time to review project results and determine needs for further research. We hope that this contribution to both the Decade for Women and the International Drinking Water Supply and Sanitation Decade will serve as the springboard for focusing attention on the development of concrete programs of action on women's issues in water supply and sanitation.

Donald S. Sharp
Associate Director (Water Supply and Sanitation)
Health Sciences Division
International Development Research Centre

ACKNOWLEDGMENTS

The seminar on "Women's Issues in Water and Sanitation" held in Manila, Philippines, 24-26 September 1984 would not have been possible were it not for the enthusiasm of all who were involved in its preparation and implementation. Such enthusiasm made the seminar challenging as well. Thanks are due to the following:

to the women project managers from 20 countries around the world who came to share their work, their ideas, and their striving for a better existence for women in the developing world;

to our consultants, Mary L. Elmendorf and Eddah Gachukia, who shared with us their knowledge of women's groups and of women's efforts to become visible and active partners in development;

to our guest speaker, Dr Celia Castillo, who challenged our assumptions and raised questions of a macroreality that have given us much food-for-thought as we go about our task of implementing projects in the Third World;

to Dr Emanuel V. Soriano, President of the Kabalikat ng Pamilyang Pilipino, who welcomed the participants and presented the seminar's objectives in the context of poverty in a developing country like the Philippines;

to the other members of the Kabalikat team who worked hard to make the seminar a meaningful forum for an exchange of ideas and a springboard for action on women's programs on water and sanitation;

to Marion M. Villanueva, Mary Lou Alcid, and Cristina Liamzon, who took care of the technical documentation and provided technical staff support for the seminar;

to the Kabalikat seminar secretariat, who attended to the needs of all the participants and guests: Ma Francia Sabio, Ma Luisa Nobleza, Crisanto Aure, Ma Cecilia Pabalan, Esther Ceguerra, Rachel Josue, and Simplicio Betonio;

to Virgilio Lacaba, Elizabeth Lolarga, and Edgardo Maranan, who helped us prepare this report; and

to the International Development Research Centre (IDRC), Canada, for its technical and financial support.

PREFACE

"Women are the main carriers of water and the custodians of family hygiene in developing countries."

With this in mind, the seminar on "Women's Issues in Water and Sanitation" was held in Manila, Philippines, 24-26 September 1984 to explore the many possibilities of enhancing women's participation in a critical area of people's development and welfare.

The specific objectives of this seminar were: (1) to review past efforts of women leaders, social scientists, planners, technologists, and funding agencies to get women more involved in water and sanitation programs; (2) to identify new strategies to enhance women's participation in such programs; and (3) to propose and develop viable projects to improve water and sanitation facilities in developing countries through the involvement of women.

Two significant international meetings preceded the Manila seminar. One was the seminar on "Women's Involvement in Community Water Supply and Sanitation" held in Cairo 12-16 March 1984 and sponsored by the Egyptian government and the International Research and Training Institute for the Advancement of Women (INSTRAW). The other one focused on the theme "The Local Decade: Men, Women, and Agencies in Water and Development." It was held in Amsterdam 20-22 June 1984 and was organized by the International Reference Centre for Community Water Supply and Sanitation with the support of the Netherlands Ministry for Development Cooperation.

During the review of past efforts, papers about ongoing and proposed projects were presented, and personal as well as agency experiences were shared. A project manager's guide was used, containing excerpts from United Nations documents, articles, and research studies focusing on various issues. Among these issues

were: women in the Third World; water and sanitation programs and their implications for public health; assessment of the nature and extent of women's participation in water and sanitation programs; evaluation of the strategies used and the constraints involved; introduction of water and sanitation technology; and case studies of projects carried out, particularly in the developing countries.

To identify new strategies for bringing about greater women's participation, the participants were divided into small working groups and encouraged to brainstorm on ideas, including new and untested concepts. The group members, representing a wealth of diverse backgrounds and experiences, were the sounding board for the ideas generated.

For viable projects to be conceptualized and developed, the participants initiated intensive discussion sessions, during which project ideas were crystalized, refined, and placed within a system of priorities. One guideline was to develop viable project concepts that have practical applications and that could be funded by the International Development Research Centre (IDRC) and other donor agencies.

The Manila seminar was designed to come up with positive, palpable results. It was expected to bring about an awareness of issues and constraints concerning women's participation, successfully identify priority strategies for field testing, help determine viable projects for funding, and lead to the establishment of an informal network of project managers in developing countries, international experts, and agencies.

The documents, abstracts, proposals, and other material gathered from the Manila seminar and presented here should indicate the seriousness, high purpose, and enthusiasm of those who participated. A lot more, however, remains to be done, underscoring the need to continue facing up to an age-old challenge by means of new and more effective responses.

INTRODUCTION

Women, Water, and Sanitation: Issues, Questions, and Prospects

Two significant events worldwide merit attention and concern. One is the United Nations Decade for Women (1976-1985), and the other is the International Drinking Water Supply and Sanitation Decade (1981-1990). Many quarters have observed, however, that few of the objectives of either event have so far been achieved. There has hardly been any real change in women's status and in their being recognized as active, visible partners in development. Case examples dramatizing the value of women's involvement in water and sanitation programs exist, but these do not represent full-scale programs that benefit large masses of women in the developing world. This can be gleaned from the papers delivered by Mary Elmendorf, Eddah W. Gachukia, and Gelia T. Castillo, and the opening remarks of Emanuel V. Soriano on the first day of the "Seminar on Women's Issues in Water and Sanitation."

The seminar topic was how to promote and expand the participation of women in improving water supply and sanitation in the poor areas of developing countries in Asia, Africa, and Latin America.

In her paper "Women as Change Agents: A Look at Action Research," Elmendorf proceeded from the thesis that the participation of women in planning and applying improved technology is needed to achieve the goals of the International Drinking Water Supply and Sanitation Decade.

The key concept here is "community." Focusing on women's roles in water and sanitation projects requires viewing and treating women as a part of total communities, rather than as a special or separate group. Women's roles, although crucial in society, are often "invisible" and taken for granted. Together with

men and children, women must be active partners in health improvement. As home managers and mothers who make important decisions, women are responsible for the family's choice of water for cooking, drinking, laundry, bathing, and other needs. Unfortunately, planners and engineers often fail to see women's active roles in the community, as though projects are primarily male concerns.

This attitude subtly reflects the social structure itself. In most communities, Elmendorf said, men hold positions of authority whereas women wield domestic decision-making powers, a clear delineation of "public" and "private" roles.

This delineation, however, is blurred when one sees the scope of the so-called domestic domain of women. As Gachukia states in her paper "The Involvement of Women in the Planning and Implementation of Water and Sanitation Programs in Developing Countries with Particular Reference to Kenya," women, who make up 60% of the total rural population in many developing countries, are collectors, transporters (haulers), storers, and distributors of water. They play the dominant role in introducing children to hygienic practices and habits related to water and sanitation.

Gachukia's paper tried to identify some constraints hindering women's full participation in all stages of water supply and sanitation programs, and what needs to be done to ensure their increased participation.

Kenya's experience was the basis for Gachukia's discussion of water, sanitation, and women in developing countries.

Castillo criticized conventional and developmental views of women's roles. In her paper, "Women's Issues in Water and Sanitation," she cautions that it is not only water and sanitation that women are or should be concerned with. Many women of childbearing age also have to earn a living outside the house. Occupation is another factor to consider. Women are fully employed, employed part time, gainfully employed outside the house, or fully occupied at home. Women come from different socioeconomic classes: upper, middle, and the poorer classes. Although there are many studies

about the poor, Castillo stressed the need to study the rich -- how they live, how they make money, and how they use and waste water. Class and sector are important categories. Women's roles also vary depending on whether they are rural or urban, agricultural or non-agricultural.

Elmendorf, Gachukia, and Castillo cited country-specific cases in discussing the problems and progress in women's participation. A case in point is the Tonga project mentioned by Elmendorf. A water and sanitation program was begun, supposedly based on "community involvement." However, only men participated. Women were excluded even from the discussion. The project failed. Analyzing the cause, it was found that in Tongan society, women are the real, traditional, decision-making power group. The project was then repeated, with women involved, and only then did it succeed.

Another example cited was a project in Honduras, wherein a women's group raised money to get water for their slum community. The barrio women's group became a community organization involving men as well. The president was a man, but women headed all the committees and were the actual change agents. Similar situations are found in slums and rural areas of the Caribbean, Latin America, Asia, and Africa. Often, the figures of authority are men, but women play crucial, decision-making roles.

Another case Elmendorf cited was the introduction of soakage pits to a Pakistani slum colony near Karachi. A social worker from the United Nations Children's Fund (UNICEF) initially approached a group of Muslim elders who were not interested in the sanitation project. Finally, the plan was taken up by a group of young male volunteers. Women were involved in selecting sites. They held classes on the use and care of improved latrines. Some women even helped in digging the pits. Women and girls attended literacy classes conducted by young women who lectured on hygiene and showed how to store water to flush the new latrines. The author's conclusion was that talking to traditional leaders may not be enough; the involvement of young men and women alike can mean the difference between success and failure.

Gachukia cited the Kenyan policy of Harambee (self-help) as a useful vehicle for promoting women's participation. The Harambee movement was launched by Kenyatta as a development strategy in the sixties. According to this principle, people are the custodians of their own development and should not wait for the government to fulfill their destiny.

Women's groups, numbering some 15 000 today, were created as Harambee groups for social, economic, and cultural projects. Women started and contributed to Harambee-sponsored or government-funded water projects. Kenyan women have been enthusiastic in mobilizing support for water projects. When asked about changes they would want for the United Nations Decade for Women, they identified water as their first priority. Their enthusiasm spills over to fund raising, mobilization, motivation, lobbying for support, and volunteer work.

However, there is a hidden constraint. Although they have been willing to raise funds and provide free labour, Kenyan women have not thought of themselves as being capable of gaining technical skills needed for actually managing and maintaining water projects. When a technical system breaks down, they do not seem to know what to do. The important thing here, Gachukia said, is to mobilize women, get them involved, but at the same time break down the myth of female inferiority. Training women as water technicians will inspire other women to overcome their sense of inadequacy.

Castillo looked at some special problems and situations that the conference papers seemed to have overlooked. Citing the Philippines as an example, she showed differences in life-styles and roles. Women in the uplands, where life is harder, play greater roles. In the lowlands, wives of the landless and their children spend more time on the farm.

Another situation involves female food vendors in the streets. Poor households in many cities of the world depend on food vending in the streets. Where there is a water shortage and people buy food sold in the streets, sanitation becomes a problem.

Finally, Castillo asked: Do women leaders really

want women to play these many roles? Some of these roles can be handled by children and men. Should technology give women more work or less? Castillo felt that women should work less, earn more, and keep it (if this were at all possible).

"Participation" is a key concept found in the statements of Elmendorf, Gachukia, and Castillo.

According to Elmendorf, differentiation of sex roles is universal, but it varies with each human community. There is also the distinction between a woman's domestic and public spheres of activity. Women have traditionally been assigned most of the domestic roles, such as giving birth, cooking, feeding, and disposing of human waste. In most traditional societies, women are drawers, carriers, and primary users of water. They concentrate on satisfying basic needs to the point that their public life is severely limited. Technological changes, however, can exert pressure on these traditional roles and cause sex stereotyping to decline, thus paving the way for a broader, deeper participation of women in developing their communities.

To achieve women's participation, people must understand and accept women's potential contributions to the effectiveness of improved water supply and sanitation, and make women aware of new information about how they can improve the quality of their lives and those of their families. Based on the concept of genuine community involvement, there must be a dialogue with community members so that needs and choices can be identified, and women's status and roles fully understood and appreciated.

Gachukia presented concrete proposals to achieve this goal: technical training to ensure self-reliance and self-sufficiency; a conscious effort among researchers, planners, and administrators to seek out women's views regarding projects; representation of women and leadership positions for them in any undertaking; and starting pilot projects in areas where the women's role is already acknowledged.

Castillo wondered: Is participation a means or an end? Is participation used to get more and safer water, or are water and sanitation being used to get

women to participate? Castillo observed that conference discussions and project proposals are not clear on the definition of participation and its purposes.

In the Third World, she said, many people, with a few exceptions, are under authoritarian rule. How is this reconciled with the participatory approach? What is needed, she concluded, is a strong national, regional, and international network of organizations and agencies involved in participation to protect those who work for expanded roles of women and people in development.

Another controversial issue Castillo tackled was "felt needs." People's felt needs are articulated, identified, analyzed, and interpreted by experts. There are several types of felt needs. One is the expressed needs of individuals or families but not necessarily of the whole community. The second is the empirically derived need, arising from an analysis of large-scale, data-based trends. Third is the systematically or scientifically determined needs established by experts through their own special methods. A fourth type is educationally induced needs, which people are trained to see and feel as their own priority needs. A fifth type is seduced felt need, stimulated by available resources for development activity or artificially created by advertising.

Castillo is for looking at all issues, including women's role in water supply and sanitation, on the macrolevel. This includes the type of government, the level of technology, and the geological and climatic conditions.

Soriano's opening remarks summed up the interest, purpose, and direction of development conferences like this one. He gave the Philippines as an example of Third World underdevelopment.

The Philippines, he said, is a country of striking contrasts between rich and poor. Extreme poverty exists. In a slum area near the hotel where the conference was being held, he said, people lack decent housing and experience hunger, disease, and malnutrition. He cited other scenarios that are familiar to people who come from developing countries. He said

the seminar should *not* lose sight of the larger women's issues in such societies: poverty, exploitation, and the unequal distribution of wealth.

Water is a good starting point for discussing how women can be freed from traditional roles to participate in decision-making processes.

The goal is for women to organize self-reliant, politicized, and conscientious communities that can solve their problems with little outside intervention.

PROJECT LEADS

Having identified the issues, problems, and constraints that hinder the involvement and participation of women in water and sanitation programs, the next task was to generate project leads that would address women's issues in water and sanitation. This was seen as a difficult but important task.

The seminar participants focused on four aspects of water and sanitation programs, and discussed the ways in which women can take a more active role. These four aspects were: (1) health education; (2) income generation; (3) repair and maintenance of water and sanitation technology; and (4) design, field testing, and introduction of technology.

Four working groups were formed, each group focusing discussions on one of the above aspects. Membership in a particular group was based on previous experience, expertise or professional interest, and capacity to undertake projects in a given topic area. The task of each working group was to identify and discuss viable project leads to enhance the role of women in water and sanitation programs. Specifically, the group members had a threefold task: to undertake a situational analysis of women's involvement in the four aspects of water and sanitation programs; to be able to identify the factors that hinder the active involvement of women; and to identify strategies that would enhance the women's role in water and sanitation programs.

Project leads generated by the four groups reflected the broad range of capabilities, interests, and orientation of the seminar participants. Project ideas ranged from community-based action research to laboratory studies that sought to validate existing folk technologies or to identify new technologies for community or household use. The conference participants also viewed the process of introducing technology/practices to households, and identified projects that

would operationalize the process of bringing water and sanitation technology to the community.

The process by which water and sanitation technology and practices are brought to the people and eventually accepted by them involves a sequence of activities. These activities may include any of the following:

- (1) Problem identification: A community has specific needs regarding water and sanitation. What is the people's perception of their priorities? What assistance do they seek?
- (2) Technology identification: This technology/practice may either be indigenous or may be brought into the community by an outside agent.
- (3) Delivery system: Community-based associations and groups, and nongovernmental organizations as well as government institutions serve as interdependent mechanisms for delivery of social services.
- (4) Acceptability of the technology: This must be determined at all stages of problem identification, technology design, and field introduction. The technology must respond to a problem or felt need, and must be culturally acceptable, relevant, and appropriate.
- (5) Monitoring: What is the effect of water and sanitation technology on health status, on women's status in the community and in the family, and on income levels?

The project ideas presented at the seminar addressed the problem of enhancing the role of women in water and sanitation programs and the impact of women's involvement on themselves, on the community, and on the water and sanitation program. Some of the ideas presented were fairly well developed, having been a concern of the participants for some time. Other project leads were in the initial stages of concept development. Still others were mere statements of problem identification, being the result of brainstorming sessions among seminar participants. All project ideas were presented during a plenary session.

The seminar organizers -- composed of Kabalikat staff Cecilia Cabañero Verzosa and Marion M. Villanueva; IDRC representatives Donald Sharp, Lee Kam Wing, and Jane MacDonald; and technical consultants Mary L. Elmendorf and Eddah Gachukia -- formed a review panel to deliberate further on the project ideas presented and to suggest ways of improving the implementation plan.

Women and Health Education: Report of Working Group I

Discussants:

Low Kwai Sim, Chairperson
Noerhajati Soeripto
Olfat El-Sebaie
Maria Therezinha Martins
Samiha El-Katsha
Alina Ratto Salazar
Gabriella Castillo Morales
Melanie Katsivo
Esther Banzuela
Maria Cipres
Mediadora Saniel

IDRC Staff/Consultant:

Jane MacDonald
Mary Elmendorf

Rapporteur:

Marion M. Villanueva

Situational Analysis

Health education is seen as an important aspect of water and sanitation programs. Because women are mainly responsible for the collection and storage of water for drinking and household use, their involvement in health education efforts can be especially meaningful and effective. As caretakers of the health of young children, women have to understand how sources of drinking water and water use may affect health. Such knowledge can help them improve the health status of their children and, in turn, the community.

PROJECT LEADS

A. Impact of Improved Water Supply, Latrines, and Health Education on Health Status (Soeripto, Indonesia)

Objectives

This is a 2-year project to study the impact of water supply and sanitation (latrines), together with health education, on the infection rates of diarrheal diseases, soil-transmitted helminthiasis, and eye and skin diseases.

Methodology

A subdistrict in the rural area of Yogyakarta, Indonesia, has been selected as the site for this study.

An experimental group and a control group of three villages each will be chosen, with each group having an aggregate population of 1000. In the experimental group, water pumps, latrines, and health education will be introduced, in addition to treatment (drug therapy). In the control group, only treatment will be provided.

Cadres to be chosen from the women's family welfare association, as well as field workers, will be trained in health education.

A household survey will be undertaken that will include the gathering of data on existing sanitation facilities. A system for monitoring individual hygienic habits will be adopted.

Clinical examinations will be made of diarrheal diseases every 2 weeks for 1 month before the intervention and for 12 months after the introduction of the intervention. For soil-transmitted helminthiasis, and eye and skin diseases, examinations will be made 1 month before the intervention and quarterly for the 1-year period after the introduction of the intervention.

A health education campaign will be launched, water pumps installed, and latrines constructed. The

project will attempt to determine the impact of the interventions on the control of diarrheal diseases, soil-transmitted helminthiasis, and eye and skin diseases.

The concluding phases will consist of data analysis and report writing.

Questions/Points Raised by the Group

The study should consider the participation of the community in making decisions on whether to introduce new water systems and what kind of systems to install. There should be a "felt need" for this new water supply system; otherwise, the new systems might not be used.

Before starting this study, the proponent should look into how the data will be utilized and who will be implementing the project. With these things in mind, the respondent group can work out the kinds of issues that would address the interests of the end users and then plan ahead with respect to whom and how to address their recommendations.

Comments of the Review Panel

The project should focus more on women as they are central to the issue of improved health status. Being the caretakers of the health of their families, women are the teachers of their children in terms of learning proper hygiene. They also bear the burden of being the main users of water.

Women should be chosen as the trainees, both as health cadres from the women's family welfare association and as field workers. The monitoring of individual hygienic habits can also be done by women.

B. Evaluation of the Coliphages Procedure as a Rapid
Method for Screening Natural Water (Martins, Brazil;
Castillo, Chile; Ratto, Peru)

Objectives

This project will study a technically simple, rapid low-cost method for determining the microbiological quality of drinking-water sources. Data from the project will be used to propose criteria for classifying water sources in terms of bacteriological indicator systems for assessing human health risks. In the process, the project expects to:

- develop local expertise in the use of coliphage detection and enumeration methods;
- determine the correlation between coliforms and fecal coliforms and coliphages in waters from Lima (Peru), Santiago (Chile), and Sao Paulo (Brazil) using most probable number (MPN) and membrane filter (MF) techniques;
- compare data obtained in South America with data obtained from another three-country IDRC project in Southeast Asia (Thailand, Malaysia, and Singapore);
- determine the relationship between coliphages and incidence of salmonella and enteroviruses in water to establish criteria for classifying water sources according to the risks due to selected waterborne micro-organisms;
- develop a field kit for coliphage detection;
- compare this to the field kit developed in Southeast Asia;
- prepare a field manual for use by public health and water authorities in developing countries.

Methodology

One hundred raw water samples, plus bottled water and drinking-water samples, collected in

triplicate, will be assayed in each of the three countries involved in the project.

Coliform detection by MF and MPN techniques will be carried out according to Standard Methods for the Examination of Water and Wastewater, APHA 16th edition.

Fecal coliforms will also be assayed by the A1 broth - 44.5°C procedure.

Coliphage testing will be conducted according to standard methods, APHA 16th edition, using the ARCAT modification.

Salmonella and enterovirus tests will be carried out using proven Brazilian procedures.

Drinking water samples will also be tested using the Canadian Ontario Government Presence/Absence Test and the Solomon Islands paper strip test.

A field kit will be designed in the next step of this research to be tested for use in the rural areas of each country.

Questions/Points Raised by the Group

The need for and potential user of the research results should be conceptualized at the proposal-writing stage. Determining beforehand who will be using the research data and findings, and how the recommendations can be implemented, will aid in the formulation of more concrete objectives.

Comments of the Review Panel

How do women fit in? How does this project address the previously discussed issues of women and their role in water and sanitation?

The field manual and kit could be developed for untrained women because they are the main users of water. Perhaps it is women who should be trained in the use of this test at the grass-roots level.

C. The Impact of Mothers' Involvement in Diarrheal Disease Control (Banzuela, Cipres, Philippines)

Objectives

This project will study the effects of mothers' involvement in the control of diarrheal diseases in a rural Philippine village. It will attempt to show how women can assist in gathering baseline data on community demographic information and health status, i.e., incidence of diarrhea, attitudes and perceptions regarding excreta disposal, use of water, and the like. It will seek to encourage the introduction and use of appropriate water and sanitation technology through the mothers' clubs. Finally, it will study the effects of the interventions on the incidence of diarrheal disease and behavioural changes in water use and defecation patterns.

Methodology

The mothers have been working together for the past 2 years and have been involved in various activities, such as running day-care centres, distributing food supplements every month, identifying problems, working out plans of action, and mobilizing themselves on other concerns.

The research team lives with members of the community from 3 to 5 days a week. Team members act as facilitators in the community, and assist the women's club in its organizational activities.

For this project, the women's club, in collaboration with the research team, will conduct research on the collection of community demographic and health status information.

Using the information gathered, the women's club, together with the research team, will define problems and determine the appropriate technology that answers their identified need. Examples of technologies that will be considered on a pilot basis (demonstration units only) include the following: IDRC-UM handpump, solar disinfection of water, and alternative latrine designs. In all cases, hygiene education will be included.

Participant observation of behavioural changes on the handling of infant excreta and defecation patterns of preschool children will be undertaken by the research team.

After 1 year, a post-test will be conducted to find out changes in community health status (diarrhea incidence), attitudes, and behaviour.

Comments of the Review Panel

The project should have two consultants: an expert on diarrheal disease research and another expert on appropriate technologies applicable to the situation.

Because this proposal is part of a package of proposals from the Philippines, there is a need for further deliberation and for collaboration among the participating groups. This is to ensure that the package of projects benefit from the unique strengths and technical expertise of each participating group.

D. Community-Based Pilot Testing of the Impact of IDRC-UM Handpumps on the Quality of Community Life of Villages in Selected Communities in Sarawak (Low, Malaysia)

Objectives

This will be an action-oriented research project to assess the impact of IDRC-UM handpumps¹ on the community. It will seek to determine whether the introduction of the handpumps increases women's participation in community activities and whether a reliable water supply will improve community health status. It will also evaluate the general awareness of personal hygiene among people in the selected villages.

¹ The IDRC-UM handpump is a low-cost handpump made of polyvinyl chloride (PVC) that was developed by the University of Malaya, Kuala Lumpur, Malaysia, under the auspices of an IDRC grant.

Methodology

The study will be carried out through a series of focused group discussions and questionnaire interviews before and after the installation of the handpumps. The questionnaire will be designed to gather data on sociocultural aspects, economic status, and attitudes toward the installation and use of handpumps.

Questions/Points Raised by the Group

The study should take into consideration the involvement of the community in deciding where the pumps should be installed and in other aspects of program planning and implementation.

Comments of the Review Panel

The study should focus on women and look at the impact the IDRC-UM handpump has on society. More specifically, the study could aim to do the following:

- determine whether the introduction of the pumps would change the use of time and economic activities of women, men, and children; and

- find out the effects of an accessible and safe water supply on community health status (although we realize that this is difficult to verify).

The methodology should also include participant observation of behavioural changes related to personal hygiene as a result of the introduction of the technology. This will supplement the data gathered from interviews and discussions.

E. Schistosomiasis Control Through Primary Health Care, MWEA Irrigation Scheme Experience (Katsivo, Kenya)

Objectives

This project aims to reduce the transmission of schistosomiasis in a rural community in Kenya by mobilizing the community to effect changes in behavioural

patterns regarding water contact, water use, and fecal disposal. Specifically, the project proposes to:

- institute improvements in community water resources;

- construct laundry units, bath units, and latrines;

- educate the population on the importance of proper use of water and proper disposal of waste in breaking the transmission cycle of schistosomiasis;

- train health caretakers, who work in village subunits, to implement and monitor a health education program at the community level;

- involve the community in all aspects of the planning, organization, and implementation of the project; and

- evaluate the impact of the above interventions on the transmission of schistosomiasis, and on community knowledge, attitudes, and practices regarding the transmission of schistosomiasis.

Methodology

A project is now being carried out in a rice-irrigation area 97 km northeast of Nairobi near the foothills of Mt Kenya, 1159 metres above sea level. Growing rice is the chief occupation in the settlement, which provides livelihood for an estimated 36 000 people annually. Each tenant farmer is allocated 4 acres (1.6 ha) of paddy fields by the National Irrigation Board.

The study area is divided into an experimental area and a control area, which are similar in most respects, with a 15-km stretch of land between them. Both villages have a natural river bordering one side and irrigation canals bordering the other.

In the first phase of the project, data on demography, sociological aspects, parasitology (including malacology), nutrition (the under-five age group), and morbidity (both from recall and clinical examina-

tions) were collected before the intervention was introduced. Data analysis is currently in progress and initial results show infection rates of 69% in the experimental area and 42% in the control area. Schistosomiasis was found to occur together with other intestinal parasites.

In the second phase of the project (not yet started), two volunteers from each study village will be trained in community health work and in construction and maintenance of latrines, wells, bathing units, and laundry units. A community health committee will also be formed, composed of village elders, investigators, village health caretakers, and technical people. This committee will then work with the villagers, providing hygiene education and advice on the construction and maintenance of water supply and sanitation facilities. Near the conclusion of the project, the study population will be reexamined for schistosomiasis. A knowledge, attitudes, and practices (KAP) survey on water contact and handling, waste disposal, and hygiene behaviour will be conducted, as well as an assessment of environmental improvements in the study area over the project period.

Comments of the Review Panel

The study should look at women as primary health care agents. More specifically, the construction of the laundry units, bath units, etc., should be designed in consultation with women; the education of the population on proper water use and waste disposal should be carried out after discussions with the women; and women should be involved in the training of health caretakers. In particular, women should be encouraged to participate in all aspects of the planning, organization, and implementation of the project.

F. Women, Water, and Sanitation (El-Katsha, Egypt)

Objective

This project is a sequel to an ongoing project being conducted by the Social Research Center of the American University in Cairo. Phase I focused on three

interrelated activities and objectives, namely: getting the local community organized, with a focus on the role of women; conducting a program of local training and information dissemination; and undertaking small practical action programs to be carried out by the villagers themselves. Based on the results of the first phase, a subsequent phase will identify some of the linkages between behaviour patterns and the transmission of sanitation-related diseases, to determine the reasons for and cultural contexts of these behavioural patterns. In consultation with the villagers, the project team will plan a strategy for changing these behaviours. Once appropriate technologies are identified, demonstration projects will be set up in several rural villages. These water supply and sanitation pilot programs will then be monitored to examine the community's reaction and subsequent behaviour.

Methodology

The methodology will be determined after the results of phase I have been analyzed.

Questions/Points Raised by the Group

The objectives of this research seem somewhat broad and should be made more specific based on the results of phase I.

In formulating more specific objectives, utilization of research results and replicability of the project should be considered in planning the program.

The research should also include an evaluation component to test the impact of the program on community awareness.

Women in the community should be involved in project implementation (e.g., in determining who will participate in the training).

G. Role of Women in Improved Water Supply and Promotion of Sanitation (El-Sebaie, Egypt)

Objective

The objective of this project is to improve the health of rural villagers through a hygiene-education program. This study will analyze a community-based hygiene-education program that aims to improve the environmental conditions of the villagers and develop a hygiene-education program using village women (the users of water supply and sanitation) as the change agents.

Methodology

The project will involve the following activities:

- conduct a baseline survey to determine community health status, environmental conditions, knowledge, attitudes, and practices (KAP survey) with respect to personal hygiene, water handling, and excreta disposal practices in selected study villages.

- perform water quality tests from various sources of water (i.e., wells, taps, and clay jars, such as the zir in Egypt);

- design a hygiene-education program and train village midwives and sanitarians to implement this program;

- implement the hygiene-education program in the study villages;

- undertake a follow-up survey after 12 months of the hygiene-education program to assess changes in knowledge, attitudes and practices, and environmental conditions; and

- after a further 6 months, conduct a final KAP and environmental survey to determine the effect of the program after formal project activities have ceased.

Questions/Points Raised by the Group

There is a need to clarify terms that are not often used and sometimes taken for granted, such as hygiene-education and community participation. What type of hygiene education will be used in the study? This should be determined after the target clientele have been identified.

Comments of the Review Panel

The research should be more specific and should take into consideration the potential use of the research findings and the replicability of the project. Will the women in the community have a voice in the selection of an appropriate training program, as well as other decisions necessary for program implementation? This is important for the success and continuity of the program.

Women and Income Generation: Report of Working Group II

Discussants:

Corazon Soliman, Chairperson
Christina Soedjarwo
Somchit Tipprapa
Chirati Tingsabadh
Chandni Joshi
Elly Utama
Ma Josefa Gaspar
Irene Santiago
Elvira Dayrit
Mercedes Banzon
Barbara Escucha

IDRC Staff/Observer:

Lee Kam Wing
Ma Yansheng

Rapporteur:

Mary Lou Alcida

Situational Analysis

Women, particularly in developing countries, suffer from a double disadvantage -- they suffer discrimination as women and they are oppressed by poverty. There is a need to identify the socioeconomic structures that keep women poor and powerless, and to build alter-

native structures. A strategy leading to this goal is to organize women to become self-reliant.

A good entry point would be income-generating projects, because these respond to a real and felt need of the people.

In analyzing the issues involved in women's participation, several questions may be posed.

Have water and sanitation projects been used to motivate women to work on income-generating activities? Or have income-generating activities been used to mobilize women to work on health and sanitation issues?

What strategies have been used to encourage women to participate in such projects and activities?

What types of income-generating activities have been implemented? Which ones have been successful and which ones have failed? What factors accounted for success or failure? What constraints were faced and how were these solved?

On the strategies adopted, the following were mentioned:

Comprehensive analysis of the situation; community or group formation; mobilization; establishment of linkages with agencies and institutions in possession of needed resources; education on the technical, socio-cultural, and political aspects of the project; institutionalization of community counterparts or a revolving-fund scheme; utilization of indigenous materials and sociocultural practices that promote collective work; and provision of support structures, such as day-care centres, to enable women to participate in income-generating activities.

Group members mentioned the following as constraints to women's participation:

- sociocultural barriers against women's participation;

- stereotyping of sex roles due to the sexual division of labour;

- corruption, as in using financial assistance or organizational funds for purposes other than what the funds have been allocated for -- a problem that group members felt could be checked through close monitoring by the donor organization or agency; and

- problems in marketing, which may be overcome by conducting a feasibility study before starting any project.

Several other issues were discussed in connection with the question of women's participation and the general idea of introducing technology into communities. Two of these were the following:

(1) Income-generating projects tagged "for women only" may lead to antagonism between men and women. In Bangladesh, for instance, men resist the idea of providing job opportunities for women because there are very few jobs available. It is feared that the training and hiring of women as water-system technicians may displace men economically. In the Philippines, husbands in a city on the island of Mindanao complained when their wives were earning more than they did. The situation became worse when the husbands lost their jobs.

There were several points of agreement:

- Everybody recognizes the need to organize women.

- Income-generating activities are indeed effective entry points for inviting participation.

- A strong educational component is a must in the task of social mobilization and, hence, one's programs must be consistent with one's organization's ideological framework.

- Because men and women are partners in development, there need not be any antagonism between them.

- Labour-saving devices (e.g., water pumps) and distribution systems free women from long hours of

fetching water and, hence, give them time for income-generating activities.

- Cultural practices and the sexual division of labour define and reinforce traditional roles that must be changed if concrete advances are to be made.

(2) How does one determine whether women have really been participating or have been liberated? Women's participation in water and sanitation projects has often been limited to serving food to the volunteers during the construction phase. In some countries, training and hiring of women to participate in construction activities has already been done, and quite successfully. But much remains to be done in the realm of the male-dominated community decision-making.

The following recommendations were made:

- Conduct research on the impact of water and sanitation programs, on the lives of women.

- Evaluate the impact of women's participation on such programs as well as on the women themselves.

- Organize women to become self-reliant.

PROJECT LEADS

A. Recycling Human Waste in an Urban Poor Community (Dayrit, Philippines)

Objectives

The proposal aims to test the viability and acceptability of human-waste recycling and determine the various ways by which this can be accomplished. It also hopes to bridge the gap between centre-based or university-based research and community-based research.

Methodology

This project would be carried out by first reviewing related literature on the technology with the

community and organizing the community to accept responsibility for a selected intervention. Actual experiments would then be conducted to assess the operational efficiency of the technology (e.g., biogas digester) in the disposal of human waste.

Questions/Points Raised by the Group

There may be a problem where slums are concerned. To build biogas digesters, space is needed. A more basic question is: how acceptable to the community is human-waste recycling? In Indonesia, for example, the biogas system of fuel generation was tried but was found to be culturally unacceptable.

The question was also raised regarding the possibility of women's involvement in the building of latrine slabs as an income-generating activity.

Comments of the Review Panel

Overall, this is an important area of concern and should be dealt with in deliberate coordination and collaboration with other Philippine projects to have a greater effect and impact on the target groups.

B. An Integrated Development Scheme for the Wives of Fishermen (Banzon, Philippines)

Objectives

The project will organize wives of fishermen into marketing cooperatives, train women in primary health care, and set up day-care centres as a support structure to allow them to become involved in community activities.

Methodology

The objectives will be accomplished by setting up an appropriate community organization and introducing health education. The nature of the health education will depend upon the circumstances.

Comments of the Review Panel

It seems that too many things are being targeted in this project lead. Perhaps the project could focus on one aspect and break it down into specific steps with a more detailed methodology on how each would be carried out.

Note: As it stands, this project idea is primarily technical assistance not research.

C. Credit as an Entry Point for a Water Supply Program in Urban Areas (Santiago, Philippines)

Objectives

This proposal aims to determine the most appropriate water supply system for a community; train women in the construction, operation, and maintenance of that water supply system; establish a credit/repayment scheme; evaluate the impact of women's participation on the program and on themselves; and determine whether or not the quality of life of women has improved due to their participation in the program.

Methodology

Organizing women has been previously identified as a strategy. An appropriate methodology for accomplishing this, however, has not yet been developed.

Questions/Points Raised by the Group

The group wanted further clarification on the characteristics of the target population and on the repayment scheme.

Dian Desa, an Indonesian nongovernmental organization (NGO), is evaluating women as managers of rainwater catchment systems. They may be a useful source of information in further developing this proposal.

An education program should be implemented

during and after the introduction of the technology.

D. Women's Involvement at the Village Level: Rainwater Tank Project (Joshi, Nepal)

Background

Women in Chippeni village in the Tangikot Production Credit for Rural Women (PCRW) site in Nawalparasi District of the Terai, in Nepal, have expressed a need for improved water systems. Because of the low water table in this area, the use of shallow wells and handpumps is inappropriate. The women, who are very industrious, must spend many hours fetching water. They would like to be free of this drudgery and be able to use their time for gainful employment.

Objectives

This project aims to investigate the technical feasibility of constructing and installing rainwater tanks in the Chippeni village of Tangikot district. Available indigenous materials will be incorporated into the design of these tanks.

Specifically, the project will examine the relationship between rainfall patterns and appropriate tank size; introduce two tanks on an experimental or pilot-study basis; conduct a social survey to determine acceptability of the new technology; and encourage women's participation in building and maintaining the water-supply system.

Methodology

(1) An experimental or pilot study of two tanks will be carried out in the study community. Two kinds of surveys will be undertaken: technical and social.

The technical survey will consist of:

- use of secondary data, such as amount of rainfall in the study area and other information from

the hydrological department;

- consultation with engineers on the design of tanks; and

- a survey of available local materials suitable for construction of the tanks.

The social survey is designed to determine the acceptability of the project among the people. Members of the women's credit group of the PCRW project will serve as respondents.

(2) On-the-spot training will be provided on the building and maintenance of the water supply system. Trainees will be selected by the women's drinking water users' group.

(3) Constant monitoring will be conducted by the Women's Development Officer, Peace Corps Volunteers, and two women workers based at the project site or village.

(4) Supervision will be carried out frequently (at least once a month) by the monitoring and evaluation officer of the PCRW's Women's Development Section (WDS).

(5) After a thorough evaluation of the project, and assuming that the findings are favourable to project replication, the WDS and donors will exert efforts to replicate the project in other project areas.

Questions/Points Raised by the Group

The matter of how clean rainwater really is must be looked into. In populated areas, it is safe to assume that surface water is contaminated. However, is rainwater any safer in these areas?

Sanitation is a problem in Nepal. Perhaps it should be addressed as another component of this project.

Comments of the Review Panel

The specific forms of women's involvement in the project should be elaborated on and specified in a more developed proposal.

E. Action Research on a Clean Water Supply for the Jakarta Slums (Utama, Indonesia)

Objectives

The general objective of this project is to determine the quality and quantity of water used by urban slum dwellers. The specific objectives are to provide 30 pumps for both public and individual use; to organize PKK (Women Family Welfare Program) groups with a view to developing and implementing a financing scheme for the manufacture of handpumps; to organize the women who produce the food item known as tempe to finance the handpumps; to field test a handpump installation and maintenance manual among the women in these slum areas; and to train 10 women in the maintenance of the pumps, the training to be conducted by the NGO Dian Desa.

Methodology

This will consist of sociological surveys, community participation, and the training of target groups, such as women's and youth organizations, in pump maintenance.

Questions/Points Raised by the Group

Unsanitary latrines are a problem, but the entry point here should be clean water. The group discussed how it would be possible to obtain clean water. Methods mentioned included: slow sand filtration, solar disinfection, and the use of malunggay seeds (the extract of which is a natural coagulant).

Comments of the Review Panel

This project seems to want to accomplish too

much. The key is to focus or limit the objectives to those that can be realized within a given time frame and then try to expand from these. The approach should be to look into a particular topic from various perspectives.

F. Rainwater Catchment Project (Soedjarwo, Indonesia)

Objectives

The project objectives are: to study the usefulness of rainwater catchment systems; to identify the technical, sociocultural, economic, and health problems related to rainwater catchment systems; and to train villagers to overcome the constraints identified.

Methodology

Surveys will be carried out to identify the problems. Appropriate solutions will be proposed and the results evaluated. Based on these results, appropriate educational materials will be developed.

Questions/Points Raised by the Group

The group suggested that the project compare different educational approaches in terms of content and process.

In content, the educational materials will deal with health and sanitation. The technical aspects will be minor in comparison.

There was a suggestion to pretest the messages to maximize significance and comprehensiveness.

G. Project to Test Women's Involvement in Water and Sanitation Among the Rural Poor of Thailand (Tipprapa, Thailand)

Objectives

The project aims to augment the income of rural women and allow them to participate in water and sani-

tation activities. Women will be encouraged to become involved in income-generating activities and in water and sanitation projects. The impact of these programs on village life will be evaluated.

Methodology

Training in the technical aspects of various common water supply and sanitation technologies will be provided; income-generation schemes, such as raising animals, will be introduced; and a loan-repayment scheme devised.

Questions/Points Raised by the Group

A word of caution was given about raising animals, especially cattle. They are vulnerable to theft and disease, and may require more input than is worthwhile. In the case of the loan-repayment scheme, it was asked what could be done in cases where the people really do not have the money to pay back.

Note: As it stands, this project idea is primarily technical assistance not research.

Comments of the Review Panel

The project details need to be threshed out to show how the objectives will be achieved. Perhaps intercountry projects should be undertaken to make it possible to learn from the experiences of others in other countries on topics such as community organizing techniques, income-generating activities, and financing or credit schemes for villagers.

Women and the Repair and Maintenance of Water and Sanitation Technology: Report of Working Group III

Discussants:

Olatokunbo Ogbe, Chairperson
Indrani Dissanayake
Mary Choudhury

Consultant:

Eddah Gachukia

Devarugsa Kruerklai
Methodia Mercado
Mediatrix Valera
Gene Peralta
Rosa Montevirgen

Rapporteur:

Cecilia C. Verzosa

Situational Analysis

Women play a minor role in the repair and maintenance of water and sanitation facilities. This has been, traditionally, a male domain.

Women perceive their role as users of water and are not expected to have a knowledge of mechanical tasks like the repair and maintenance of handpumps. In addition, they have a fear of becoming "overburdened" with more tasks once they display an aptitude for repair and maintenance work.

The group identified those who are now performing these tasks -- men, women, or neither. The group also identified which of the tasks women could perform.

The operation and maintenance tasks may be grouped into three categories: (1) those related to water supply systems in general; (2) those related to specific types of water supply systems; and (3) those related to sanitation systems.

Tasks in the operation and maintenance of water supply systems: Men are usually in charge of the planning involved in the construction of water-distribution systems. They regulate the hours of use of the system; collect fees; undertake major and minor repairs; and take charge of the storage, purchase, and distribution of spare parts.

Women, on the other hand, have two tasks: to collect fees and identify operational problems. Given the chance, however, they can undertake minor repairs, as well as handle the storage, purchase, and distribution of spare parts. In addition, the task of training villagers in the proper use of the system is often neglected.

Operation and maintenance tasks related to specific

water supply systems: Men usually perform tasks such as siting and digging of wells, and routine maintenance of handpumps, as well as major structural repairs and provision of security. Routine operation of motorized pumps, washing and maintenance of filters, and the repair of distribution networks are also tasks that have been traditionally allocated to men.

On the other hand, women have been involved in identifying the repair work to be done by the men. Again, given the chance, women can attend to the cleaning and maintenance of filters, as well as to the management of the water distribution network.

Tasks in the operation and maintenance of sanitation systems: Men and women have just about equal tasks. Men determine the design and supervise construction, whereas women are credited with determining water usage, cleaning of latrines, and cleaning the surrounding environment.

The group came up with the following basic assumptions for project proposals:

A proposed project should have women's issues as a basic consideration.

This means that women, together with men, will be actively involved in planning and implementing the project. The strategy is to make women visible, active partners in the operation and maintenance of water and sanitation technologies.

The approach for involving women may take either of two forms: simplify (define) the technology, or train women to understand the technology.

An underlying assumption is that the technology must be culturally appropriate and acceptable to women if it is to succeed. It is important that women be involved in all aspects of choosing the technology.

PROJECT LEADS

A. Village-Level Technologies for Water Quality Testing by Women (Peralta, Philippines; Ogbe, Nigeria; Kruerklai, Thailand)

Background

Numerous water supply projects have been implemented, but most of these seem to have overlooked the need for water quality controls. Villagers are not trained to monitor water quality nor do they understand what water quality means. Unfortunately, existing methods for determining water quality are complicated, foreign, and unfamiliar.

However, there are existing beliefs and indigenous knowledge about various methods traditionally used to determine water quality. These beliefs could have valid scientific bases.

It is worth exploring the feasibility of developing and refining such indigenous methods, as these are likely to be used and accepted by local residents. In addition, knowledge of such traditional methods is usually held by women.

Women could carry out the water quality analyses utilizing local materials.

Objectives

This project aims to:

- (1) identify folk technologies known to villagers, especially women, for water quality control;
- (2) explore the scientific basis of these local beliefs and traditions; and
- (3) promote the use (by women) of folk technologies, if these are proven scientifically valid.

Methodology

(1) Carry out a field survey of traditional water quality testing techniques involving the following:

- select a study area;
- formulate a questionnaire to determine knowledge, attitudes, and practices concerning water quality;
- document the various methods used;
- analyze the information collected;
- carry out appropriate analyses to determine the scientific bases of these techniques; and
- promote the most scientifically sound technique.

(2) Scientific validation of methods of water quality testing:

- select the traditional methods to be studied;
- assess the materials used;
- analyze the water quality in the area using standard scientific methods;
- compare the findings with traditional methods of analysis; and
- consult with experts regarding the findings.

(3) Selection of alternative methods:

- formulate criteria: availability, cost, ease of operation;
- compare the methods used;
- select the most efficient and practical methods; and
- disseminate the results of the research.

(4) Dissemination and promotion of methods:

- prepare an easy-to-read instruction manual on traditional water quality analysis techniques.

Comments of Review Panel

If the "folk technologies" are found to have no scientific basis, the project should seek to identify and promote alternative appropriate technologies that women can use.

B. Effect of Women's Training on Operation and Maintenance of Water Supply/Sanitation Systems: A Cross-Cultural Case Study (Ogbe, Nigeria; Kruerkalai, Thailand; Mercado, Peralta, Valera, Montevirgen, Philippines; Dissanayake, Sri Lanka)

Background

Two critical elements of a water supply system are operation and maintenance. It is not enough to design and install a water system. What is more important is that the system is properly used and maintained so it can effectively serve the beneficiaries for an extended period of time.

Poor operation and maintenance are the result of several factors. One is the improper use of the system, which may be due to a lack of knowledge on the proper way of using it. Another factor is the limited involvement of the villagers (end users). Important maintenance procedures may be neglected because no one is responsible for undertaking the activities. It has also been observed that operation and maintenance are often left to outside agencies or to a few selected individuals (in most cases men). But as women are the main users of water supply systems, they should be responsible for operation and maintenance.

When women are informed about and involved in the operation and maintenance of water supply systems, these systems are likely to be more effective and efficient.

Objectives

This project seeks to develop the capability of village women to operate and maintain water supply systems. Specifically, it aims to:

- evaluate the effectiveness of women caretakers on the operation and maintenance of water supply systems;
- compare the operating characteristics of water supply systems, for which women caretakers are responsible, with those operated and maintained by conventional means;
- identify the factors (e.g., age, education, civil status, family size, occupation) that facilitate/hinder participation of women as water supply system caretakers; and
- identify those characteristics observed to be most effective in promoting the proper operation and maintenance of the system.

Methodology

Women will be trained in the installation, operation, and maintenance of selected water supply systems. For comparative purposes, a study area will be selected where women have not been involved in these activities.

In the study area, the following activities will be undertaken:

- the establishment of a program for creating women's awareness about the operation and maintenance of water supply systems through an information campaign using village-based women's organizations and networks;
- the identification of women who are interested in operating and maintaining water supply systems;
- the establishment of a training program for women interested in the operation and maintenance of

water supply systems;

- an evaluation of the performance of the workers and the extent of the women's involvement; and

- an evaluation of the technical and economic viability of the system.

Once the women caretakers have been trained and deployed, data about the operating characteristics of water supply systems in the study and comparison areas will be collected. These data will include the nature, frequency, and duration of breakdowns. Factors that facilitate or hinder the capacity of women to operate and maintain the water supply systems will also be identified and a cost-comparison study of the operation and maintenance of the various water supply systems will be carried out.

Questions/Points Raised by the Group

Nigeria expressed great interest in undertaking a similar study but focusing on the slow sand filtration technique documented by the International Reference Center (IRC) of the Netherlands.

Comments of the Review Panel

Add the variable: length of service as caretakers, comparing the experiences of both men and women.

At the field level, involve an established women's group in project implementation.

C. Women's Role in the Collection, Storage, and Utilization of Rainwater Systems (Mercado, Philippines)

Background

Water is necessary for life. Because water has many crucial uses, various systems for its collection and storage should be known or made known to all, particularly women.

Women should be given special attention because they are the ones who use water most often. They use water not only for drinking, but also for cooking and cleaning, as well as for agricultural purposes.

Unfortunately, water is not always accessible, making it imperative for the residents of these places to be aware of the techniques used in collecting, storing, and utilizing rainwater. Women, more than anyone else, should know these techniques.

This research project will develop an information module on such techniques designed for women.

Objectives

This project aims to:

- create an awareness (in women) of rainwater collection and storage systems;
- popularize known techniques for collecting, storing, and utilizing rainwater;
- determine what can be done by women in the construction, operation, and maintenance of rainwater catchment systems using local materials;
- develop an information module for women about the collection, storage, and utilization of rainwater; and
- disseminate copies of the module to women in countries where the information would be useful.

Methodology

A field survey will be undertaken to determine women's awareness of collection and storage practices and to find out the extent of utilization of rainwater.

The results of the field survey will be used as baseline data for the construction of model rainwater catchment systems using local materials and involving women.

An information module for women about the techniques involved in the collection, storage, and utilization of rainwater will be devised.

Comments of the Review Panel

The construction of rainwater catchment systems could be an income-generating activity for women.

D. Instruction Manual for Women on the Operation and Maintenance of Low-Cost Pumps and Latrines (Choudhury, Bangladesh)

Background

Seventy-five percent of the population of Bangladesh lives in rural areas. More than half of these village residents do not have access to safe water, a condition that leads to a high rate of water-borne diseases. Studies show the incidence of cholera among women to be double that among men in the age group 15-39 years. Knowing that women in this age group use traditional sources of drinking water (surface water) that are usually unsafe, there is a need to promote the use of protected sources of potable water, such as tubewells.

The health of the family is the mother's concern. As she and her children belong to the high-risk group, educational materials should be designed for their use.

In the last 2 years, the Village Education and Resource Centre (VERC), the International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B), the Department of Public Health Engineering (DPHE), and the United Nations Children's Fund (UNICEF) have been field testing simple handpumps and water-sealed latrines for use in different regions of the country. Furthermore, at present, 165 women are functioning as the caretakers of these pumps.

These organizations have taken steps to involve women in the operation and maintenance of water supply and sanitation technologies.

Objective

The objective is to develop simple instructional materials to:

- enable women to assemble and install handpumps and simple pit latrines;
- serve as a training guide for use in explaining to women the proper use and maintenance of handpumps and latrines; and
- serve as a prototype manual for adaptation to local circumstances in countries that have similar water and sanitation programs.

Methodology

Collection of baseline data: A survey to determine the population's present, knowledge, perceptions, and concepts of water potability and their experiences with handpumps and pit latrines will be conducted. Implementing agencies will also be consulted to gather information on current hardware being installed.

Setting of messages: Based on the baseline data, appropriate messages will be presented in cartoon form.

Pretesting and revision of materials: The cartoons, along with verbal instructions, will undergo a series of pretests among a representative sample of the target audience to determine their comprehension of the messages; revisions will be made accordingly.

Large-scale field testing: The final document will be field tested at all project sites to determine if there is a need for further modifications.

Dissemination of the materials: The finished product will then be available for incorporation into ongoing programs.

Expected Outcome

The project's final output will be a pretested

instruction manual for village women on the operation, proper use, and maintenance of handpumps and pit latrines. The programs involved in installing hardware (the installation of tubewells and latrines) will be provided with this much needed software component (information materials).

Comments of the Review Panel

Once a manual for villagers on the installation, repair, and maintenance of the IDRC-University of Malaya handpump has been successfully developed for use in Malaysia, Thailand, and the Philippines, PIACT/Bangladesh should be able to use that experience as a basis for developing other manuals on other types of pumps.

E. Enhancement of Women's Roles in Water Supply, Sanitation, and Environmental Activities (Gachukia, Kenya)

Collaborating Agencies

Women's organizations, Department of Adult Education, media organizations, Ministry of Water Development, Health and Education.

Background

The effective involvement of women in water supply and sanitation projects has proven to be a determining factor contributing to the success of such projects. The degree of women's involvement from country to country and from project to project is determined by varying sociocultural and economic factors. Constraints hindering the desirable goal of women's active involvement need to be identified and strategies for overcoming them developed to suit every culture and socioeconomic background. In that process, it is necessary to eliminate stereotypic views and attitudes held about women, and by women, concerning their roles and capacities. It is also necessary to develop a multidisciplinary strategy aimed at the media for the promotion of positive attitudes toward women's involvement

in all aspects of operation and maintenance of water supply and sanitation facilities.

This research seeks to document the constraints inhibiting the involvement of women and the strategies that have been developed or are necessary for overcoming such constraints. Such strategies include short-term action programs (skills training) and long-term education programs (curriculum development and preparation of materials for the media).

Objectives

This project aims to conduct a sociocultural and anthropological study to determine the nature of and conditions necessary for the effective involvement of women in water supply, sanitation, and environmental activities, and to enhance the promotion of women's roles in these activities.

Methodology

A field survey of women's involvement in water supply and sanitation projects will be undertaken, the data to be gathered through questionnaires, interviews, and observations.

New projects will be identified and a strategy prepared for adoption. Women will be involved at all stages of project development and implementation such as: needs assessment, motivation of community women, visits to other projects, planning, installation of the technology, data collection, training of community women, operation and maintenance, monitoring and evaluation, and identification of spin-off activities.

Communication materials for strengthening women's roles will be prepared and used in existing programs: in the public media, in literacy campaigns and adult education, and in women's organizations and groups.

Comments of the Review Panel

There is a UNDP project in 17 countries concerned

with the promotion and support of women's participation in water and sanitation programs, excluding environmental concerns. This project lead can be undertaken as a parallel activity.

Women and Technology: Report of Working Group IV

Discussants:

Zeina Raffoul, Chairperson
Sim Suanie
Komol Sivaborvorn
Bep Fritschi
Sonja Barrett
Jacqueline Zambrano
Rachel Polestico
Tessie Fernandez

IDRC Staff/Observer:

Donald Sharp
Mayling Simpson-Hebert

Rapporteur:

Cristina Liamzon

Situational Analysis

What is the extent of women's participation in the design, testing, and introduction of water and sanitation technologies? What roles do they play?

Based on existing literature on the subject, women's participation has been minimal, especially at the grass-roots level. A Sri Lankan experience demonstrates that women can play an active role in the design and manufacture of handpumps.

As women have been involved in the field of engineering for some time, it is not unreasonable to seek women's participation (at the grass-roots level) in the design, testing, and introduction of new water supply and sanitation technologies.

The group reviewed agency and country experiences regarding the roles of women. In the Philippines, women have been involved in introducing various technologies into villages. It has been demonstrated that women with know-how in water supply and sanitation technologies are accepted and have credibility at the village or community level. In these cases the technologies introduced were more readily accepted by other women (the end users).

The group also identified factors that encourage women and other villagers to participate in water supply and sanitation projects. When women have been involved as change agents, they have been trusted more than men. This is thought to be a result of the fact that they can easily identify with women's concerns.

The factors that discourage women's participation were also identified. Among these were: lack of consultation in idea formulation; lack of an organization to sustain their participation; and the fact that men often take over a project when the women's input has been identified as successful.

Sometimes, social, cultural, and political factors are not really considered. For instance, the installation of a handpump may hamper the socialization process among women around their community well. Another discouraging factor is the sheer powerlessness of women, particularly those who are among the landless. Influential special interest groups in the village may define the project and decide where the pumps will be installed without consulting those who must use the pumps.

Two technologies were identified as having been tested and introduced with the participation of women; a wastewater treatment process in the Philippines and the construction of rainwater catchment jars in Thailand. The first involved the use of water hyacinths to remove nutrients from polluted water and the second concentrated on women's involvement in a cottage industry for the manufacture of traditional Thai rainwater collection jars.

PROJECT LEADS

A. Involvement of Women in the Construction of Rainwater Catchment (Fernandez, Philippines)

Background

Pagtambayayong Foundation in the Philippines has organized eight low-cost housing cooperatives. These are composed primarily of urban slum dwellers who cooperatively purchase and develop their own land for

housing on the outskirts of Cebu City. Roughly 500 families are expected to be relocated to these sites within the next few years.

The lack of accessible water sources is a constant problem in the hilly areas where these cooperatives are located. At present, the families in one 5-ha area fetch water from two 200-foot deep (61 m) wells that are often pumped dry. Because rain is quite frequent in Cebu, the construction and use of rainwater catchments would be a practical alternative to deep wells.

Objectives

This project aims to involve 50 women in the design and construction of 400 rainwater catchment systems. In the course of the project, the quality of the water for drinking purposes will be explored. Factors that determine the effective utilization of this type of water storage system will also be identified.

Specifically, the project aims to: train women in rainwater catchment construction techniques; test three or four alternative designs to find the most suitable in terms of durability, convenience of use, quality of water produced, and personal preference; construct 400 rainwater catchment units; study the performance of the systems; and determine ways of purifying the water to potable quality, if necessary.

Methodology

Phase 1: Training

Volunteers will be selected from among the members of the housing cooperatives for training in the construction of these systems.

Phase 2: Construction

Using three or four designs, the women will construct up to 400 rainwater catchment units. In line with the agency's philosophy, beneficiaries will contribute their resources to the project. This might include

sand, stones, labour, and small amounts of cash. The initial subsidized efforts will allow the communities to acquire the construction, maintenance, and organizing skills to earn the confidence of everyone. This phase will take from 3 to 6 months.

Phase 3: Comparison of Designs

The operating characteristics of these pilot systems will be recorded over the study period.

The beneficiaries will meet regularly to discuss observations and share views on maintenance and use.

Phase 4: Water Quality Testing

Water purifying techniques for rainwater collection systems will be investigated in consultation with the local water resource centre. The units and various disinfection methods will then be evaluated to determine which is the most effective and efficient.

After this, the women should be able to discuss which rainwater catchment system is most suitable under certain situations and which method of purifying water is most effective.

Comments of the Review Panel

The proposal should explain further why this particular technology was chosen and state the number of rainwater catchment systems needed. It must also state whether these rainwater catchment systems will be built for each household. Will these catchments, designed and constructed by women, take on an income-generating role? That is, can they be sold? Will the income-generation aspect be part of the research? If so, how will it be evaluated?

This proposal clearly shows that initial work has already been conducted in the development of rainwater catchment technology. It is also one of the few project leads that is community-based and directly addresses women's concerns about not being involved in the implementation of a technology that affects their lives. It is a project that should be applicable elsewhere.

B. A Study on Women's Participation in Water Use and Resource Assessment, Data Collection, and Project Implementation (Poletico, Philippines)

Background

In recent development literature, the words participatory and data-based decision-making are often incorrectly taken as guarantees for success in project implementation. This assumption is made despite the fact that project implementation, especially at the village level, is very difficult to manage, particularly when too many parties are involved.

Many participatory studies are carried out without comparative data to demonstrate the efficacy of the participatory approach. The participatory approach is encouraged simply because of the apparent failure of the top-down approach. Also, many studies conducted in the Philippines have focused on the socioeconomic aspects of the participatory approach, whereas few have investigated the effectiveness of the participatory approach for transferring innovative technologies to the village level. This is especially important if the villages are expected to make their own technical decisions. Lastly, few, if any, of these studies examine the participation of women in community development projects.

A study is needed to test the following hypothesis: a project has more chance to succeed if the participatory approach involving women is used to design and implement a community-development project.

Objectives

This project proposes to evaluate the success of water projects by comparing the difference between those implemented with and without the participation of women. Specifically, the project aims to:

- compare the quality of survey data gathered by men and by women with respect to the implementation of water projects;
- document the nature of the local decision-

making process involved in the implementation of water projects; and

- compare the success of water projects initiated and implemented by women with those initiated and implemented by men.

Methodology

The project will be divided into two phases. The first phase will investigate the comparative quality of the technical information gathered by men and women on water use and water resources development. The second phase will examine differences in the quality of water-related projects that are managed by men and by women.

In the first phase, four villages will be selected. Women and men will be trained to gather water data such as amount of rainfall, flow rates of springs and streams, water availability, and water use habits. They will conduct the survey over a 1-month period. At the end of the month, the project team will evaluate the quality of data gathered for accuracy, sensitivity, specificity, and thoroughness.

The second phase of the project will involve reviewing the implementation process of water projects to determine how they differ when managed by either men or women.

Comments of the Review Panel

This project may be undertaken as a cross-cultural study to obtain data on women's participation in water use, data collection, and project implementation. The process and methodology must be well documented to enable other countries to undertake follow-up studies. If the methodology is shown to be effective, the team members who developed it could be asked to serve as consultants.

C. Purification of Water in Households by Simple Technologies (Sim, Singapore; Raffoul, Lebanon)

Objectives

The project will determine the feasibility of water disinfection at the household level by housewives through the combination of the use of plant extracts (certain seeds) and from exposure of water to sunlight. Both processes will be tested in the field using a simple, low-cost, and rapid bacteriological field-testing kit.

The specific project objectives are to:

- identify local seeds known to have coagulating properties that may be effective in water purification;
- determine specific local conditions with respect to the use of sunlight (intensity, duration, etc.) for water disinfection;
- develop expertise in the use of certain seeds and sunlight to disinfect water as well as the use of water quality field-testing kits;
- assess the bacteriological quality of the water before and after treatment; and
- disseminate the findings of the evaluation, recommending methods that could be used by housewives to disinfect water at the household level.

Methodology

The research team will familiarize themselves with the proposed purification methods and the field-testing procedures.

Male and female technicians will be trained in using the purification methods and the field kit.

Laboratory-based experiments will be carried out to establish performance characteristics under controlled conditions.

Field testing of the purification methods will then be conducted in selected rural villages.

Water quality tests will be conducted before and after the introduction of the water purification processes. Based on the findings of the research, the most practical and effective water purification methods will be recommended for household use through local women's organizations.

Comments of the Review Panel

The following points have to be clarified:

Does the project envisage using trained technicians or field workers? This proposal is concerned with both introducing the technologies at the field level and with laboratory technical testing. It would be more practical to divide this into two separate projects.

In principle, the project addresses a very common, but serious, problem -- that of water potability.

General Project Leads Generated by the Group

(1) Ways must be developed to make toilets or latrine facilities and water-supply technologies more attractive or appealing to communities.

Communities appear to place more value and priority on having a television set than on safe, hygienic toilets and potable water sources. They consider a television set a status symbol. A possible strategy is to find ways to make a toilet or a hand-pump, etc., a status symbol comparable to a television set.

Suggestions were made on ways to make toilets more attractive, such as painting or decorating the rooms where the toilets are located.

(2) Evaluate the use of role models (e.g., women professionals and change agents), leaders, or those with status in the community that have credibility with members of the community in helping to promote water

and sanitation technologies. In the Philippines, midwives and schoolteachers have a high status in the community and can be asked to help influence community members to accept water and sanitation technologies. In Egypt, religious leaders can play a similar role. Urban migrants who have learned improved sanitary and hygienic practices can also be asked to help motivate those in the rural areas to change their habits.

(3) Integrate water and sanitation issues in primary/secondary school curricula. A suggestion was made that for women to be effective, they should have access to formal training in health education. Including water and sanitation issues in the health and science curriculum of schoolchildren could make attempts to change sanitary practices more effective. Where possible, the classroom should be used as a venue for changing stereotyped roles of boys and girls as far as the specific culture will allow (e.g., a picture of a boy and girl working together in oiling a handpump or carrying a pail of water).

(4) Study the negative impact of introducing water supply technologies in certain communities. An experience in one area of Botswana was cited -- when a continuous water supply was made available to a community there, a drastic change in behaviour occurred. Although people used water very sparingly before, they began wasting water after it became more readily available. This was seen as a negative result of technology introduction.

(5) Develop methods of making people aware of the need for the proper disposal of child waste (feces). In some cultures, fecal wastes of infants and children are not seen as harmful or as a possible source of disease. These children defecate anywhere. A project in Sri Lanka was cited. Toilets especially designed for children's use were built in courtyards so that children would have easy access to the facility and would not be afraid of going to the toilet.

(6) Develop improved, simplified methods of prospecting for water. In a number of societies, divining for water is used as a means of finding a water source. In many cases, people who have this skill are not used to find water sources. Neither has there

been an attempt to study the scientific validity of this method or how divining for water is accomplished so that others may put such skill to good use. A suggestion was also made to investigate new methods of prospecting for water.

General Recommendations of the Group

(1) Professional women must share their skills and expertise with women at the village level, particularly vis-à-vis water and sanitation projects.

(2) Women who have the potential to become leaders should be identified.

(3) Issues concerning women's participation, and the constraints against it, should be determined.

(4) Research should be conducted on the roles of boys and girls in developing countries.

(5) In planning projects, the project manager should start with what already exists.

(6) The participatory approach should be used in research and technology testing.

(7) Designs should be tested in the community, where people can provide immediate feedback, rather than in the laboratory.

(8) Water and sanitation projects should be seen as home and family projects so that these may become acceptable to all concerned.

CONCLUSIONS

The year 1985 marks the end of the United Nations Decade for Women. During this decade, an increasing number of researchers and professionals have focused attention on the conditions, lives, and experiences of women in developing countries. The area of water supply and sanitation merits such attention because of the role of women in water collection and its usage. The Manila seminar on "Women's Issues in Water and Sanitation" has served to emphasize women's participation, to promote women researchers, and to focus attention on examining women's roles in water supply and sanitation projects. It is not sufficient to pay lip service to women's participation, rather it is necessary to consciously plan and develop programs with women as an integral part -- both as project leaders and as full participants.

During this seminar, 22 project leads aimed at enhancing the role of women in water supply and sanitation projects in their communities were developed.

The first obstacle has been overcome: ideas have been put down on paper. Now, the ideas must be developed and translated into reality.

Coming up with good ideas to help the disadvantaged is, by itself, quite an accomplishment. The rationale given for each project lead speaks of a basic aspect of people's welfare in the developing world, where development efforts are needed most.

Funding viability, of course, is a different matter. Because funds are limited, some project leads may have to be shelved for the meantime to give way to projects that address more pressing problems. Other project leads may be integrated into existing proposals or ongoing projects. Still others may be improved upon or revised, based on current efforts.

Good project ideas will not remain ideas for long. Sooner or later, they will be transformed into actual projects. If there is a genuine need to implement such projects, groups and associations can always pick up those ideas, on their own initiative, based on their own development perceptions.

The seminar brought together project managers experienced in field implementation. Their efforts will play a crucial role in the attainment of the goals of the International Drinking Water Supply and Sanitation Decade (1981-1990). They serve as a link between the communities of men and women whose living conditions demand attention and action, on the one hand, and those who profess concern for these communities' welfare and have the means to act, on the other. Field-based managers interact intimately with community members and are eyewitnesses to the oppressive conditions endured by disadvantaged people in most regions of the Third World. The consensus of the participants was that the success of water and sanitation projects/programs can be enhanced if women are involved. They must be properly trained to manage programs and they must understand the technologies involved. Most importantly, present managers and policymakers must make room for and encourage the participation of talented women (from the relatively uneducated villager to the highly trained professional). Finally, women must take the initiative to make themselves heard and become involved.

The seminar was fortunate to have as resource persons international experts on issues, such as water and sanitation, which concern women. Interacting with them certainly helped seminar participants gain a much broader perspective and understanding of the problems in developing countries.

It is hoped that the project leads generated during the seminar will spark the interest of many more project managers in developing countries and inspire them to help in promoting and enhancing the role of women in water and sanitation programs.

The intent of publishing this report is to reach project managers in developing countries with the hope that they can review the issues surrounding women's

role in their own water and sanitation programs, determine the relevance of the project ideas presented at the seminar to their own local situation, assess the viability of their projects, and be inspired to take action, now.

ABSTRACTS OF PAPERS

Women's Role in Water Supply, Sanitation, and Environmental Control (Brazil)

Maria Therezinha Martins

The wide Brazilian territory is divided into five different regions, each having specific geographical, sociocultural, and economic characteristics. There are varying degrees of development -- at the same time, each region faces problems of industrial pollution, concentration of population in urban centres, drought, poverty, malnutrition and endemic diseases, sanitation and water supply problems, floods, and poor housing.

The slums are the areas with serious health problems because of poor sanitation and water supply. With no potable water and with poor sewerage systems and services, millions of Brazilians face grave dangers. Efforts to change these conditions include the installation of water supply networks in slums.

The participation of citizens is encouraged by the program's objectives to make people conscious of the importance of water quality, hygiene, and health education. A program for water supply and sanitation must deal with the community's sanitary, social, and economic conditions, and come up with data on waterborne diseases, causes of death, and their implications.

In Brazil, women professionals have been involved in research work in laboratory studies, environmental pollution control, environmental impact studies, environmental planning, water quality control, etc. However, the literature indicates that there are still fewer women in these fields than men, they remain underpaid, and they are treated unfairly. Men still get the higher positions and higher pay.

Women, however, are potential change agents in improving sanitation and water supply. The author recommends that women professionals participate more actively in water supply and sanitation, hygiene, water protection, and health education projects. Women must be responsible for systematizing data on their participation in different professions. They must pay extra attention to the matter of "typical female professions," and launch a campaign to make women conscious of their situation.

Brazil has much in the way of natural and human resources. Given a more balanced programing and planning scheme, water supply and sanitation problems can be solved in due time. There is also a need to change social structures to make way for women to express their potential.

Role of Women in Having Safe Water and Promoting Sanitation (Egypt)

Olfat El-Sebaie

In the world community, women still play the vital role of promoting sanitation. They are responsible for acquiring and preserving the means to ensure the health of their families and of the whole community. One means to good health and proper hygiene is the acquisition and preservation of safe water.

The author discusses a sanitation problem in an Egyptian village where safe water is the main concern of the people. Facilities and equipment are inadequate to provide a steady water supply. Traditional hygiene practices must be improved or changed to bring about improvements in community health.

As women villagers are seen as the main catalysts in promoting sanitation and hygiene, the main objective is to develop an environmental health training program for women so their knowledge will be increased, their negative practices will be checked, and new insights on health and sanitation will be applied.

The author chose a village as the study area for a survey. The village's health status was determined

through questionnaires and direct observation. Water samples were studied for quality. While working closely with and informing the villagers of the developments in the study, women leaders in the community were identified and recruited to the program. They were trained in personal and community hygiene and tested on the application of what they had learned. A health education committee will monitor the implementation of projects. Community participation may be encouraged in this activity. A follow-up survey will be conducted to evaluate the effect of the program on the community.

Women, Water, and Sanitation: The Dian Desa
Experience (Indonesia)

Christina Soedjarwo

Dian Desa, an appropriate technology group concerned with rural development, has implemented a water supply project that aims to provide rural people with access to clean water. This project expects to eventually create a healthy, safe, and clean environment.

Before launching the project, Dian Desa staff met with the village leader and other influential persons who had brought up the matter of improving the water resources. Traditionally, only men can sit in on this kind of discussion. The meeting addressed the objectives and mechanics of the project.

As the direct beneficiaries of the project would be the village people, the staff stressed that the project belonged to the people and their full cooperation and participation were most important if the project was to succeed.

A water supply system was designed and installed after consultation with the people. The villagers were divided into small groups. Each group contributed what they could to the project. Women were involved in the implementation.

The results of the project, however, were not encouraging -- the design of the water supply system was unsuitable to the needs and cultural habits of

women in rural Indonesia, who are used to bathing, washing, and carrying water from rivers and canals.

As end users of many technologies, especially water supplies and sanitation systems, women determine the success or failure of such projects. In this case, traditional practices did not allow their full participation in the project. Their actual needs were glossed over, if not totally ignored.

Dian Desa went back to the women and tried to encourage them to attend important planning meetings. It was found, however, that it was more practical to assess the women's views and determine their needs through individual interviews -- in between household chores -- and through direct observation. It was concluded that further education on the relationship between water supply and sanitation was needed to make the project work. Simple technologies should be developed so women can participate more fully.

Women's Role in Water and Sanitation (Peru)

Alina Ratto Salazar

Peru's rugged terrain and uneven population distribution have made basic sanitation services inefficient. A high proportion of the population lacks potable water and appropriate sewage systems, especially in poor, backward, rural areas.

This condition has contributed to high mortality rates among children, the spread of infectious and parasitic diseases, and other health-related problems. This condition is worsened by high migration rates from rural to urban areas, where low-income communities or slums have developed.

The Ministry of Health, through the Director of the Environment, is in charge of water-quality control in rural areas. Policy decisions and sanitation services are mainly controlled by men, even though physical, chemical, and microbiological analyses of water are carried out mainly by women. There is a need for women, as beneficiaries of water and sanitation programs, to become more involved in this activity.

Domestic hygiene is part of environmental health. For women to be influential at this level, the cooperation of elementary schoolteachers, most of whom are women, is vital to the success of the program.

Improving water and hygiene conditions in the home will definitely benefit women and their families.

The issue of water and women must be faced in an integral manner such that women can and will assume a concrete and significant role in solving water supply and sanitation problems.

The Surigao City Mothers Club: A Model in Community Development (Philippines)

Adelina A. Cabarrubias

The project has its roots in the Mothers Club initiated by the Surigao City Health Office in cooperation with the Kiwanettes. The city health office was concerned about the high morbidity and mortality rates, and as a result ran an informal class for housewives to improve sanitary conditions in households and the community. These were called mothers' classes, which eventually evolved into a mothers club.

Having become more sensitive to their health needs, these women voiced the need for safe and adequate water supplies. As barangay residents had to travel from 1 to 3 km to fetch their drinking water from mountain sources, it was decided that a piped water system was needed to bring water to the barangays.

The project began in 1981 with UNICEF aid. The mothers club actively assisted husbands and engineers who installed and fitted the pipes, dug trenches, and excavated and built reservoirs. Women prepared meals and snacks.

The second phase of the project came in 1984 to extend and repair existing water systems and build new systems. Fourteen barangays were given new water-supply systems. Thirty jetmatic pumps, for installation on wells, were distributed to 10 barangays that had no natural sources of water.

The results of the project have been encouraging. Sanitation projects and beautification activities were promoted and implemented concurrently. Research showed that malnutrition was greatly reduced, with a marked decrease in the number of cases of gastroenteritis and other communicable diseases.

Barangay Environmental Sanitation Implementation Groups (BESIG) were formed to oversee the sanitation aspects of the project. Water-sealed toilets were installed. The people contributed materials and labour. Mothers were given the responsibility of maintaining the water system, sustained by a small monthly fee collected from each household. A spirit of self-reliance was generated.

To sustain interest and motivation in continuing to provide important health services to the recipient communities, incentives are offered at each professional level. Medical kits are distributed to health workers, nutritionists, and hilots (traditional midwives). Awards for outstanding contributions to the community are also given out.

The Role of Women in the Control of Soil-Transmitted Helminths (Indonesia)

Noerhajati Soeripto, Djauhar Ismail, and Supargiyono

Parasites, such as soil-transmitted helminths, can be transmitted through contaminated water or directly via the fecal-oral route. The causes are associated with food, sanitation, and personal hygiene practices. Available, sufficient, and clean water supplies are a precondition for the control of parasite transmission. Providing clean water and sanitation facilities and knowing their proper and consistent use are basic in primary health care.

In Indonesia, every adult female in both rural and urban communities is eligible to be a member of the Family Welfare Association, a government-sponsored organization concerned with health programs, family management, employment, and child-care practices. In Yogyakarta, Central Java, a soil-transmitted helmin-

thiasis control program was carried out under the auspices of this association.

The study showed that after mass drug treatment, the introduction of improved water supplies and latrines, and intensive health education, the prevalence rate of helminthiasis was greatly reduced.

The project site was the rural subdistrict of Kasihan, Bantul Regency, Yogyakarta, Central Java. The people are poor; environmental sanitation is lacking; and safe water is unavailable. All drinking water comes from open dug wells. In addition, most people do not have basic latrines. Indiscriminate defecation is common.

To attain the program's goals, several activities were carried out:

- The people of Sentanan, Nggoren, and Gedongan Jeram Tabag were treated with Trivexan tablets once a day for three consecutive days, the only exceptions being children less than 1-year old, sick people, and pregnant women.

- Water supply and sanitation conditions were improved by building more wells and latrines, and repairing those in poor condition. In Sentanan and Nggoren, 10 new wells were built, bringing the total number of wells to 69; in Sentanan, 30 latrines were either constructed or repaired and in Nggoren eight latrines were either constructed or repaired; in Gedongan Jeram Tabag, no wells or latrines were built or repaired.

- Fecal examinations were carried out on 40% of the population involved in the project before the construction of new water supplies and latrines, and before the mass drug treatment. Follow-up fecal examinations were conducted on a regular basis.

- Health education, dealing with environmental sanitation and the epidemiology of soil-transmitted helminthic infections, was given by the project team to the people of Sentanan and Nggoren. Women were the focal point for promoting proper personal hygiene and sanitation practices. These campaigns were held with

the help of formal and informal leaders from the communities, the local health centre, and sanitation workers from the provincial health department. The women's educational program was held twice a week for 2 weeks, and included lectures, discussions, slide presentations, and simple field demonstrations.

In the afternoons or evenings, senior medical students examined and monitored the hygienic practices of the people, visited people at home, and observed and interviewed them using a questionnaire.

Findings showed that mass treatment, improvements in water supply and sanitation, and intensive health education in Sentanan effectively reduced the prevalence rates of soil-transmitted helminthic infections. The prevalence rates of A. lumbricoides, T. trichiura, and hookworm infections in Sentanan, 6 months after the intervention, were lower than in Nggoren and Gedongan where conditions differed in the availability of water supplies, latrines, and health education.

The reduction in prevalence rates of A. lumbricoides in Sentanan was 81.8%; Nggoren, 67.2%; and Gedongan, 61.7%. For T. trichiura, it was 27.9% in Sentanan, 28.5% in Nggoren, and 23.9% in Gedongan. For hookworm infection, the rates were 32.1% in Sentanan, 35.2% in Nggoren, and 8.6% in Gedongan.

Schistosomiasis Control Through Primary Health Care: MWEA Irrigation Scheme Experience (Kenya)

Melanie Katsivo

In Kenya, nearly 2 million people are infected with schistosomiasis (mansoni or haematobium). In this country, where rapid population growth and poor sanitation are problems, developing an irrigation scheme and water conservation program is important in assuring the people's general health and productivity.

Schistosomiasis is an insidious disease that weakens general health, inhibits growth, and is physically debilitating. The usual methods for controlling the disease -- chemotherapy and mollusciciding -- have had little long-term success. The schistosomiasis control

project aims to lessen the transmission of the disease in a rural area 97 km northeast of Nairobi, near the foot of Mt Kenya. Mahigaini is the control area and Thiba the experimental area.

This project was designed to measure the impact of improved environmental health on the control of schistosomiasis. To do this, the project will improve community water resources; construct necessary laundry, bathing, and latrine facilities; educate the people on the importance of proper water use and waste disposal; train health workers at the village level to implement and monitor health education programs; involve the community in project planning, organization, and implementation; and evaluate the impact of the interventions on the transmission of schistosomiasis.

To attain these objectives, the first phase in 1983 trained field workers in the environmental, sociological, and parasitological aspects of the disease. The training included interview techniques, observation methods, recording of information, collection and proper handling of laboratory specimens, and taking anthropometric measurements of children. The survey included collection of information on knowledge, attitudes, and practices of the people on schistosomiasis and personal hygiene. Five of the most popular water collection and bathing sites were observed for water contact and defecation habits.

The field workers were grouped to observe and collect data from a particular cluster of households. After 1-month of observations, the field workers collected nutrition/morbidity data.

As the project is ongoing, the results of the study have not yet been analyzed.

The Villager's Manual on the Installation, Repair, and
Maintenance of the IDRC-UM Handpump (Malaysia,
Philippines, Sri Lanka)

Cecilia C. Verzosa and Marion M. Villanueva

Since 1978, the International Development Research Centre (IDRC) and the University of Malaya (UM)

have been collaborating on the development of what is known as the IDRC-UM handpump. This handpump, for use by villagers in developing countries, is made of low-cost polyvinyl chloride (PVC) and is designed to be produced, installed, and maintained at the village level.

In 1983, a multicountry project was launched to produce a manual for illiterate and semi-literate villagers on the installation, repair, and maintenance of the IDRC-UM handpump. This project, implemented in Malaysia, the Philippines, and Sri Lanka, was designed by the Program for Appropriate Technology in Health (PATH), with financial support from IDRC.

A manual, developed with and for villagers, especially women who have little knowledge of and experience with mechanical devices like handpumps, was needed before introducing the technology at the village level. In all stages of materials development, women were involved. Their understanding of the manual was an important project objective.

The methodology for developing the manual was first tested by Kabalikat ng Pamilyang Pilipino in the Philippines and later adapted for use in Malaysia. It involved the following steps:

- conducting in-depth qualitative research on the villager's knowledge of and perceptions about water potability, water use, and its relation to health, as well as experiences with water supply systems, including handpumps;

- identification of key technical instructions;

- visualization of messages;

- repeated pretesting until a targeted level of comprehension has been reached; and

- field testing.

During the field test, groups of men and women were given copies of the manual, the pump components, and a well ready to be fitted with a pump. They were asked to install the handpump using the manual as a guide. No previous instructions or demonstrations were

given by the trainers who were there to observe mistakes. The villagers successfully installed the hand-pump with the aid of the pictorial manual.

The project proponents gained valuable experience in developing the manual. They recommended the following: (1) keep the manual simple yet thorough; (2) use tools that are familiar and available to end users; (3) use detailed illustrations rather than photographs, as the former proved more effective; and (4) emphasize that repair and maintenance problems are likely to occur.

With the handpump manual, men and women are expected to better understand and appreciate the technology. However, it must be pointed out that there is still a need for constant dialogue and interaction between the project implementors and end users to ensure the relevance and practicality of the newly introduced pumping technology.

Village Handpumps: A Report on the Initial Seven Months of Implementation (Philippines)

Mediatrix P. Valera

Like other developing countries, the Philippines needs clean and reliable sources of water. In 1980, only 43% (21.2 million) of the total population of 49.4 million were served by public water supplies.

In answer to the need for safe sources of water, the Philippine Business for Social Progress (PBSP) applied for funding from the International Development Research Centre (IDRC) to finance a research project on improving rural water supplies. PBSP is a private, nonprofit foundation that initiates, sponsors, and assists socioeconomic development projects.

The project had four main stages: group/community building, technical training, fabrication and installation of handpumps, and evaluation of the impact.

The first stage strengthened existing community structures and developed knowledge, skills, and attitudes of beneficiary groups. Community workers were

requested to act as facilitators with the help of community organization volunteers.

Technical officers were trained in fabricating, installing, operating, and maintaining the handpumps. The officers, in turn, trained volunteers who acted as "barefoot technicians" in the village.

During the initial stage of the project a demonstration unit was set up. The above-ground components were fabricated locally by the Science and Technology Center, whereas the below-ground components were supplied by IDRC from its project in Malaysia. Villagers contributed their labour.

The last phase (although not yet finished) will be carried out through a built-in scheme to observe the program and evaluate the impact of the project.

For the first year, the following sites were chosen: Sta. Cruz, Canaman; Sto. Domingo, Bombon; Salvacion, Ocampo; and San Jose, Pugay. For the second year, the sites are: Sta. Cruz and Divina Pastora in Bato and Perpetual Help and Sta. Teresita in Iriga. These are all in Bicol, Southern Luzon.

The following are guidelines for the selection of handpump sites: (1) the beneficiaries should be willing to participate actively in the project; (2) there should be at least 10 household beneficiaries per pump; and (3) water-quality tests will be conducted to determine the potability, or presence of contamination, on all wells where the pumps will be installed.

A baseline survey was carried out at all project sites to gather data on existing water systems and to determine the knowledge, attitudes, and skills of residents as far as handpumps are concerned.

For the duration of the project, operations will focus on the installation of 30 handpumps, continuous technical training, monitoring of water quality, and evaluation of the project's performance.

Women in Handpump Technology (Sri Lanka)

Indrani Dissanayake

The aim of the Sarvodaya Movement, a non-governmental organization in Sri Lanka, is to build a "no-poverty society." The necessity of providing clean and adequate water supplies for Sri Lankans is one of the Movement's goals.

The project's three main goals are:

- to set up a small-scale workshop for women at the village level where they can manufacture, assemble, maintain, and repair handpumps;
- to test a low-cost well-drilling technique and develop 50 wells; and
- to install the locally designed and manufactured handpumps and evaluate their technical performance.

To achieve these objectives, 20 women from 10 villages in Amparai District in the Uva province were selected as participants. These women are being trained by Sarvodaya technicians in the manufacture, assembly, maintenance, and repair of handpumps and in actual drilling techniques.

Ten village workshops are being set up. A main workshop will be established in Padiyatalawa where some of the simpler components of the handpumps can be manufactured.

The central workshop of Sarvodaya, in Colombo, will be the manufacturing centre for all above-ground components (pump stand, etc.).

The women are also being trained to evaluate the technical performance of the pumps.

The project has carried out some activities in pursuit of its objectives: it appointed a Water Supply Board to conduct workshops and seminars on the proper use of water; all 20 female trainees have completed their training program; buildings (workshops) in the project area are now under construction; and a survey has

been completed on health and sanitation, and key social and economic aspects of the study villages.

Women's Participation in Rural Water Supply: Improving
Handpump Technology (Thailand)

Devrugsä Kruerklai

The provision of clean water to Thailand's rural areas began in 1964, peaking in the past decade when the government declared 1981-1990 as the Thailand Decade, in conjunction with the United Nations International Drinking Water Supply and Sanitation Decade.

This was geared toward the formulation of specific policies, targets, and action programs that would affect 50 000 villages throughout the country where water-supply services were inadequate.

Since then, small-scale rural water supply projects have been widely distributed by 15 local agencies that independently plan, carry out, and monitor their own programs.

There are about 52 000 deep-well handpumps nationwide. Unfortunately, the handpump program has been a failure because of poor design, lack of effective maintenance strategies, lack of effective maintenance at the grass-roots level, financial constraints, and a shortage of spare parts.

The new project aims to improve handpump technology in Thailand through studies that investigate patterns of using water from handpumps and the performance and maintenance problems of handpumps. Better handpump designs to make installation, operation, maintenance, and repair manageable; and guidelines that ensure better technical and management systems with regard to rural water supply are expected outcomes of the project.

Initial findings showed that only 2% of village caretakers assigned to look after the handpumps are women, and those pumps under the supervision of women are in better condition than those under the supervision of men.

Although women's participation is still limited, it is hoped that with the establishment of more efficient and more effective mechanisms, they can play a bigger role in promoting and disseminating the technology.

Toilet Usage (Philippines)

Methodia B. Mercado

Toilet usage and sanitation are basically the concerns of women, housewives in particular. The proper use of toilets is important in preventing intestinal diseases and maintaining a clean and healthy environment.

This paper studies economic conditions, cultural rituals, and beliefs associated with the use of toilets among ethnic groups, specifically among the people of Bokod and Kapangan municipalities of Benguet province, Northern Luzon.

The project has three objectives:

- to identify the existing types of latrines and investigate the variables affecting latrine use;
- to adapt and install an appropriate number of latrines and monitor their use; and
- to develop, carry out, and evaluate suitable health education strategies to promote community acceptance and maintenance of latrines.

To attain these objectives, the following activities are being undertaken: orientation and training, pre-testing of questionnaires, a survey to collect baseline data, health education activities/lectures, installation of latrines, evaluation surveys, data analysis, and report writing.

The pretested interview schedule covers the socioeconomic background of the respondents, health conditions, toilet usage information, water sources, and other information related to the project's objectives.

Solar Disinfection of Drinking Water at the Household Level (Lebanon)

A. Acra, Z. Raffoul, and Y. Karahagopian

To meet the World Health Organization's objective of "health for all by the year 2000," the project will give women in developing countries basic information on solar disinfection of drinking water. This project is aimed at women in rural villages and communities where water is scarce and usually unsafe for drinking and other domestic use.

Simple and inexpensive, this disinfection method might be the answer to health problems caused by contaminated water in developing countries.

The project proponents discussed other common methods of water disinfection such as boiling, adding chlorine compounds, and adding potassium permanganate. These methods, although widely used, have not been successful for use in developing countries. Boiling may kill bacteria, but it is also costly and results in an undesirable taste. The addition of chlorine compounds also is not practical in developing countries. Expensive and not readily available, chlorine compounds produce an unfavourable taste and smell. Potassium permanganate causes a pinkish colour, making it less agreeable for consumption.

On the other hand, solar disinfection has many advantages. It is simple, cheap, and readily accessible. By exposing water to sunlight, women are relieved of tiresome chores and are able to carry out more productive activities.

The authors carried out experiments to test the effectiveness of solar energy to disinfect water.

Water containers (glass and transparent) were selected, filled with water, and set up in a place where sunlight was available. The containers were exposed to the sun until late afternoon or evening to allow the water to cool.

In each experiment, the number of hours required for bacteria to die under three different conditions:

exposure to sunlight, room lighting, and total darkness, was recorded. In all cases, exposure to sunlight was effective in destroying bacteria.

During the experiment, it was discovered that although the method proved successful, it could not be ascertained exactly how long it took viruses to become inactivated because of their resistance. In this regard, further studies are necessary.

APPENDICES

Keynote Address: Women, Water, and Sanitation

Gelia T. Castillo

One of the disadvantages of being middle aged is people do not invite you to learn. They invite you to be an expert, to make a speech. After listening for 2 days to the genuine experts around this room, I can now claim to know more about water and sanitation than I did before coming here. What is truly attractive about this seminar is that the participants are all involved (you are, in fact, project leaders or project managers) in what I call literally "on-the-ground" projects. It is a great opportunity for me to be with such a unique group of doers, in contrast to the usual gathering of "tellers" who offer each other counsels of perfection that remain perfect until put to use.

What I have to say this morning was stimulated by what I've heard from women who have done something about such a basic need as water. It is with humility, therefore, that these thoughts are shared with you by way of informal remarks.

There are four aspects of water and sanitation that I would like to address: technology, geology, and climate; women; participation; and research and evaluation.

Technology, Geology, and Climate

I am pleased that this is not just a meeting of social scientists. We have here a hydraulic engineer, a biochemist, a microbiologist, and specialists from other disciplines. I say this because we must never assume that the technology is all right, and the only thing that is wrong is what is in people's heads. Quite often, there is something wrong with the technology; the

technology does not work and that's why we can't get anywhere.

And participation cannot substitute for technology that does not work, geology that is difficult, and climate that is uncooperative. Both in research and in action, these factors are absolutely essential; hence, the need to involve engineers, biochemists, physicians, etc. It is not always people's beliefs and attitudes that are the constraints. Again, I am pleased to see that some of the proposed projects will become interdisciplinary or at least there will be a consulting relationship with specialists from other disciplines.

After listening to you these past 48 hours, I did an exercise in identifying possible water and sanitation situations, grossly speaking. There is nothing sacred about these except to highlight the difference in the problems that we will be faced with.

The first is a situation where there is no easily accessible water supply, either natural or contrived. If this is the case, there is a problem of distance, time, and energy required to carry the water, the kind of container to use, who gets the water, and what the transportation system is like.

The second situation is where water supply is easily available from natural sources -- rivers, creeks, lakes. Even the Nile River is an excellent example of this easily accessible water source. I remember when the IDRC board met in Egypt 4 years ago. One doctor told us that although a pump had been installed for drinking water, there was an old man who woke up early each morning to dip his water pitcher into the Nile because the water tasted better. I don't blame him. The issue in this case is one of quality of water and not how to prevent further pollution.

The third situation is where a contrived water supply is not easily accessible but geologically, climatically, and technologically possible. This is where the community or the neighbourhood must organize to bring the water supply to their place through credit schemes, income-generating activities, etc.

The fourth situation is where a contrived water

supply is available but inefficiently used and inequitably distributed. For example, in this meeting, nobody has raised the macrolevel national issue as to what kind of water system we should have and what kind of technology should be adopted. Remember the slides shown about the city water system in Brazil? This is why many of us in the developing world are indebted from head to toe. We acquire substantial foreign loans to invest in high technology, but who benefits from it? A very select sector, while the bulk of the population still do not have water. This is also true with irrigation. We started with big dams that generated big problems with no solutions. Now, we are moving to smaller, communal irrigation systems that hopefully will be more manageable and more widely distributed. This is a macroissue about water systems that somebody should be concerned with because huge amounts of borrowed money have been lavished on them.

The fifth situation is where a contrived water supply is on the verge of being made available. One issue is where to locate it. Do we locate the pumps where landless households live? Because they do not have land, they do not have a place to dig for this pump. In this situation, there are other issues of technology design; issues of institutional design, such as how it is going to be operated and maintained, how much will it cost, and how will fees be collected; issues of utilization; and issues of equity. The rainwater catchment project in Thailand, for example, began with the slightly better-off households, and now they are moving into the poorer sectors using a different strategy, i.e., starting with income-generating activities to raise funds to pay for the materials.

The sixth situation is where neither contrived nor natural water supplies are easily available and geologically and climatically difficult, except with the application of very high technology or with the grace of God. When one goes to the Sahelian Desert, this is the picture that emerges. The problem is completely different.

There are other issues that have not been raised at this meeting. For example, there are seasonal dimensions to water availability, use of water, and type

of water-related problems. During the wet season, there is too much water; dry season, not enough of it. The kinds of diseases associated with the seasons of the year are also quite different. We have to relate these to activities taking place in the community at different times of the year that indicate varying water requirements.

The other issue is how water is actually used. We need more detailed information on this if we are going to make changes in behaviour, changes in technology, etc. How is water stored? Who does what? The answers to these questions have technology, training, and age/sex role implications. There is still another issue on possible conflicts in the use of water. In the Philippines, in Indonesia, and perhaps in other places, irrigation water is also used for household purposes. If farmers apply insecticides and other chemicals, and irrigation water is used for domestic purposes, we have a problem.

As mentioned earlier, we need to deal with macropolicy, i.e., what type of water system, at what cost, and for whose benefit? This is where we should get educated women interested in water and sanitation so they can do the macrolevel studies. We have brilliant economists involved in nutrition and poverty issues, using their powerful tools of analysis. They can show how other interventions affect different sectors of society. We should entice some of our female elites to do these studies on water and sanitation.

Women

The next aspect concerns women. Which women are we talking about? They are young, adolescent, middle age, or old. They are single, married, or divorced and are in different stages of the family life cycle. Incidentally, the stage in the family life cycle is important because it determines how much time women can realistically devote to water and sanitation activities. When we think of all these roles we want women to perform, let us not forget that it is not only water and sanitation that concerns them. Family planning programs want them to be involved in family planning. Nutritionists want them involved in nutrition. Cooperative movements want them involved in cooperatives.

Schools want them involved in the school system.

Meanwhile, studies have shown that in many cases childbearing women have to earn a living outside the home. Children are often left in a situation known as "children taking care of children." Given these circumstances, who do we train on the proper use of water? Perhaps the children themselves because they give drinking water to the younger children, feed them, and influence sanitation practices through their own behaviour. This is why IDRC is supporting an interesting child-to-child training project. This is a more realistic approach to a real problem.

In our development program experience, it is women past the childbearing stage who have more time to devote to group meetings, leadership training, and other activities we want them to attend. Hence, the stage in the family life cycle is an important consideration in developing water and sanitation programs involving women.

Another factor to take into account is women's occupational status. Are they fully employed; part-time workers; gainfully employed outside the home; or fully occupied with the home? There are some households where women have plenty of time on their hands. Let us not kid ourselves that every woman is working hard because there are places where they are not. When we find such situations, we can assign them more roles. But when they already have an 18-hour working day, we need to think of creative ways of shortening their day.

Women also belong to a number of socioeconomic categories: upper, middle, and lower. From the discussions here, the focus has been on poor women. Although I have great sympathy for this priority, let us not leave out the upper class for at least two reasons:

- Twenty-five percent of the urban female labour force in the Philippines are employed as household help. They have to deal with the water problem although they work with upper and middle class families.

- We do not know much about rich women. Let me

explain. At a research conference last year, somebody asked the keynote speaker, who dwelt at great length on the problems of poverty, what kinds of studies social scientists should do. His reply was "We should focus our research on poverty and the poor." I could not help commenting that "the poor are already overstudied." We ask them all kinds of questions like: what they eat and how much, how many times they make love, what they use when they make love, etc., and now we even ask them: "Where do you defecate, and what do you think of your own wastes?" In other words, we have all these studies about the poor. We know a great deal about them; we are just not doing enough to improve their situation.

What we need are studies on the rich: how they live, how they make their money, how they use water, or even how they waste water. If we knew more about these, and told the poor about how the rich are misusing water that might have flowed their way, then perhaps we can generate more excitement. The reason we know a lot about the poor and not much about the rich is because it is almost impossible to get past their iron gates to do interviews and make observations. We need to explore secondary sources of information. If we want to find out about water consumption, looking over records of water bills and payments might be useful. The number of swimming pools or deep wells dug may not be too difficult to count. If there is only so much water underground, too many deep wells in exclusive residential areas means that certain areas, even nearby low-income neighbourhoods, will not get much water, even assuming that resources could be found to dig a well. We need to find out who misuses water and who gets deprived as a result.

The next pertinent question about women is: Are we talking about urban or rural women; agricultural or nonagricultural? For example, we found that in rice production, women's participation in the physical production process is not the same for the lowland irrigated and the upland areas. In the lowlands, wives of landless households and their children are hired as farm labour doing manual work. Farmer's wives are less involved in the physical work in irrigated lowlands. In the uplands where farming is more physically demanding, women play a greater role doing manual work. I

would imagine that these differences in women's roles will also be seen in different ecological settings for water and sanitation.

Then, we have women and technology. I like the presentation on changes in the design of the latrines and the bathing/washing areas based on preferences and actual usage. To what extent can we involve women so they can help in designing water and sanitation technology?

Another area of concern that was not mentioned at this meeting is women and street foods, and the role of water and sanitation. Many poor households in many cities around the world depend on street food vending as a major source of livelihood. The Equity Policy Center in Washington has a major research project on this that was carried out in Iloilo, Cairo, Nairobi, and Dakar. Where there is a shortage of water and many people buy food from these vendors, sanitation leaves much to be desired. A drinking glass probably gets dipped in the same water pail 50 times. What can we do to improve the water supply and sanitation surrounding the preparation and selling of street foods, which are also bought by poor households?

Incidentally, among the low-income urban households in the Philippines, women are the major breadwinners. As someone from Bangladesh said at our meeting last year, "It seems to be universally true that men can walk away from their children and families, but women cannot." It may be for this reason that women have become so entrepreneurial for the family's survival. I used to be proud of the fact that Filipino women hold the family purse, but this is wonderful only if the husband's income is P2000 a week. A wife can have the fun of budgeting, deciding how much and what to allocate money for. But if the husband makes only P50 a week and the wife is still expected to have food on the table, snacks for the schoolchildren, and transportation money for the husband, she has to be a "magician" to manage these limited resources. If one faces such a burden, a wife probably would not mind relinquishing the "purse" to the husband and letting him worry about how to feed the family.

Less obvious than the previous roles associated

with females is women and watersheds. In some countries, women have become active protectors of trees in the watersheds because they know that if there is no water in the lowland, it is because somebody in the uplands has been destroying the watersheds.

My next question is something you may not like, but I will ask it anyway. Do we really want women to play all these roles? Don't we want them to be relieved or to unload some of these burdens to somebody else, like males or the children? We find in household studies that some children are not contributing much to the performance of household chores; perhaps they can take over some task their mothers are saddled with.

A more controversial issue relevant to women's roles has come up in agriculture. There are those who argue that certain agricultural technologies have given women more work, and there are those who complain that technology has displaced female labour. To these two questions comes a retort from a male technology developer: "Make up your mind. What do you want? You want women to work less or to work more?" My answer to this is "We want women to work less; earn more; and keep it" (if this were at all possible).

Participation

The third aspect of the water and sanitation problem is participation, although it is almost a heresy to ask this question in a group like this. What is participation? What does it mean? Everyone around the table talked about it, but I am having a hard time specifying what participation means. Is it conflict/confrontation? Is it labour contribution? Is it decision-making? Is it being a trainee, a project manager, an implementor, or is it participation in technology design? What is it? There is no doubt that definitions of participation will differ, and, furthermore, there could be a substantial gap between concept and practice.

Another important factor to think about is the methodology for bringing about participation. How do we encourage women to participate? Sometimes, participatory advocates are so committed to participation that

the advocacy for the method is completely nonparticipatory. How many women actually participate in a participatory project in a community? In a new book that came out a few months ago on "How Participatory is Participatory Development?" I noted that it is still the local "elite" women, relatively speaking, who are involved, although they are not rich by any means. We have not yet reached the lower levels, the so-called poorest of the poor. But I think we will eventually get there.

The next question on participation is, "Are we looking at participation as a means or as an end in itself?" Do we want to use participation to obtain more and safer water, or are we using water and sanitation to promote participation? There is nothing wrong with either of these, but we have to make it clear right from the start so that when a project is evaluated, we would know what to look for, and we can identify what has been achieved. In the discussions and project proposals presented here, it is not clear whether participation is a means or an end or both. What is clear is everyone wants to use the participatory approach. I have nothing against promoting participation for participation's sake, but let us specify that this is what we want. In the end, if we do not get any water, that is all right as long as women learned how to participate. But I believe that at this conference, we are interested in getting water and sanitation through women's participation.

What is curious and intriguing about the focus on participation is that throughout the developing world, with few exceptions, we are all under some form of authoritarian rule -- some more, some less, but authoritarian nevertheless. And yet, everyone talks about participation. How do we reconcile authoritarian rule with participation? Has authoritarianism given rise to the recognition of participation as a desirable approach, especially at the grass-roots level? At any rate, participation carries its own risks, and I am interested in seeing a strong, national, regional, and international network of organizations and agencies involved in this approach. This could provide mutual protection and international clout for those engaged in this type of action program based on the assumption that most regimes are sensitive to international public opinion.

We only hope this assumption is warranted.

Next on my agenda is the concept of felt needs. Based on an analysis of actual practice in development programs, I have arrived at a typology of felt needs:

(1) People's felt needs are those elicited, identified, articulated, analyzed, and interpreted by experts through in-depth studies, house-to-house visits, participant observation, group interviews, or random sample survey of respondents. Despite the most optimistic assessment of people's readiness to voice their needs, it is not often that such expressions come spontaneously without some outside prodding. How salient, for example, are water and sanitation needs in the minds of people? Water, perhaps, but sanitation, I doubt. When nutritionists go out to identify felt needs, they usually find malnutrition. When water and sanitation experts go out, they will most probably find water and sanitation needs. There is nothing wrong with this predisposition "to find what one is looking for," but perhaps we should admit that "people's felt needs" are never purely theirs by the time these needs have been "processed" and interpreted. More important is that people's felt needs may be the expressed needs of a few individuals or families, not necessarily those of the community or the group. Experiences have shown that the village head who often speaks or is assumed to speak on behalf of his village has a more parochial view of his village. In some instances, it may not go beyond his family's backyard, where a water pump has been installed purportedly for the community.

(2) Empirically derived needs are those that arise from an analysis of large-scale or macrolevel trends as indicated by available data over time. Examples of these are needs deduced from population figures traced since 1903. Who do you think stimulated our need for family planning? The demographers did, by putting together all the data, calculating population growth rates, and pointing out their implications. Before these calculations, graphs, and projections were made, population control was hardly a felt need.

(3) Systematically or scientifically determined needs are established by the experts through their own special methods. Typical of these are those determined

by nutritionists, health and sanitation specialists, physicians, environmentalists, agronomists, etc. As Lynch puts it: "A need may be dire but unfelt, and immediate action is sometimes the prerogative of those who are specially trained for it." We may add, with the participation of the target groups. I often tell my nutritionist friends, half-facetiously, that if they were not around weighing children and classifying them as first degree, second degree, or third degree, we would not have malnutrition. In general, people are concerned with putting food in their stomachs, not so much about calories, vitamins, protein, and minerals. In developed countries, people count calories because they do not want to get fat, but in many poor households the preoccupation is having more, not less, to eat because there is never very much on hand.

(4) Educationally induced people's felt needs are those needs described in (2) and (3) that people are trained to perceive and feel as their own priority needs. This is the essence of development communication, population education, nutrition education, agricultural extension, and health education. Why else do we want to train women in hand washing, germ theory, and the oral-fecal route of infection? So people will feel the need for something they may not even be aware of and begin to act on their own behalf. Almost every case project presented at this conference has an educational component to train women so they will understand and feel the need for water and sanitation.

(5) Seduced felt needs are needs aroused by the availability of resources for certain types of development activities. Water and sanitation, women-in-development, population control, etc., may or may not have salience at all for certain communities, but are pursued by the professionals because money is available. Why do you think we have many conferences on women in development? This does not mean that the need would not eventually be perceived, felt, and given priority. And this also does not mean that the "need," e.g., programs for women, is not a real need. The only thing I am saying is that sometimes it takes a "seduction" process.

Felt needs may also be seduced by advertising, the typical approach to which is to create a need where

there was none felt before. Often, because of our commitment to certain solutions to problems, we have a situation of "solutions running around looking for problems." For example, someone asked why we are always talking about the handpump. Are we in danger of trying to find the problem that fits the solution rather than vice versa? Credit is one such patent solution "sold" to us for a wide range of problems. Now, we are all reaping the sad consequences of such a seduction. Unfortunately, the recommended remedy for an inability to repay is "more loans," euphemistically called "restructuring."

This typology of needs is not ideological, not theoretical but pragmatic and operational in the sense that these are the ways of felt needs in the real world.

Research and Evaluation

The fourth aspect is research and evaluation. There are lessons that professionals in water and sanitation can learn from programs on irrigation, rural development, farming systems, and agroforestry. For example, the diagnosis and design (D and D) methodology developed by the International Council for Research and Agroforestry (ICRAF) focuses on food, fodder, fuel, shelter, and raw materials for income-generating activities and conservation. I wonder if this group or somebody could develop this kind of general diagnostic question that can be applied to water and sanitation ecological settings. This will be helpful, particularly to nongovernment organizations (NGOs) who do not have time for research methodology development but who need this kind of diagnostic tool for designing their interventions. Because NGOs are engaged in field action projects, their input into the content of this diagnostic methodology will be quite apropos.

There is an exciting trend in agricultural research -- farmer participation in technology development. Could we also have women's participation in the design and development of technology for water and sanitation? As a first approximation of the problem, we need to get a minimum amount of data in what is currently known as rapid rural appraisal. Expensive, intensive baseline surveys, especially those done by hired inter-

viewers, are no longer fashionable. I have been involved in many such projects where implementation has taken place; funds have been overspent; and the project itself has run out of steam, but the baseline data have yet to be analyzed, let alone written up. Think of a few critical questions that will provide us operationally significant data. Arriving at a few meaningful questions is harder than an all inclusive "shotgun" style interview schedule. At any rate, we need to work on it.

Equally valuable is the use of research results for feedback to the community or for the design of training programs. A more recent innovation is participatory research where the people themselves gather data, an approach that gives them firsthand insight into their own problems.

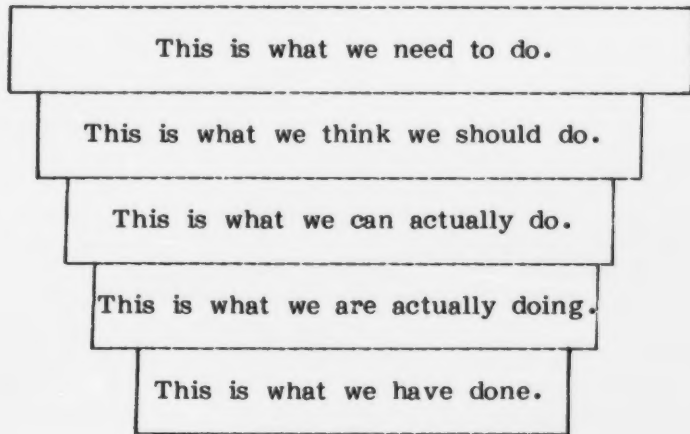
For a rapid appraisal, we need to arrive at the minimum indicators for participation, water quantity, quality, sanitation levels, etc. In this connection, it is encouraging that someone from this group is looking at a rapid, low-cost method of determining bacterial content, water potability, etc. Such an innovation is urgently needed.

A further suggestion on research is to emphasize behavioural variables, i.e., actual practices on water and sanitation, rather than respondent attitudes. Being a sociologist, I am not against the study of attitudes, but we also need to know actual practices. This approach is provided by the study from Egypt done by a non-social scientist. She showed us the big jar and the small jar; how water is transferred from one to the other; and how glasses are used. This is the kind of information we need to find out what is problematic in this water use. On this basis, some changes in water practices and in technology may be indicated. Behavioural indicators are easier to monitor than attitudes, although the latter are no less important.

Having explored a number of ideas with you, let me turn to the participants at this conference who are the real experts. We can learn and share from the different program interventions that have been used by project managers in this room. I am amazed and fascinated by the creativity that characterizes project

approaches and yet, these experiences have not been documented, analyzed, and shared. Everyone starts a project from scratch. Why should we reinvent the wheel when we can start from level 3 instead of level 1? My challenge to all of you is to put in writing what most of you have said so your experiences can be shared; promising lessons reproduced; and negative ones avoided. Then, perhaps, we can have a women's movement for water and sanitation.

Finally, we can dream dreams because dreams are free, but translating them to reality is a herculean task. I think there are 22 potential projects from this meeting, but I do not know how many will materialize. Development is, in fact, a series of inverted pyramids. What do I mean by this? Let me illustrate:



This inverted pyramid is not just a figure of speech. It is a fact of life.

PARTICIPANTS

Consultants

Dr Mary Elmendorf, 535 South Blvd. of Presidents,
Sarasota, Florida, USA, 33577

Dr Eddah Gachukia, Chairman, Department of
Literature, University of Nairobi, P.O. Box 21389,
Nairobi, Kenya

International Participants

Ms Sonja Barrett, Research Officer, Rural Industries
Innovation Centre, Private Bag 11, Kanye, Botswana

Ms Mary Choudhury, Program for the Introduction and
Adaptation of Contraceptive Technology (PIACT), 1/7
Block A Ground Floor, Lalmatia Housing Estate, Dhaka
7 (GPO Box 3544), Bangladesh

Ms Devarugsa Kruerkalai, Chief of Training, Rural Water
Supply Division, Ministry of Public Health, Devavesm
Palace, Bangkok 10200, Thailand

Ms Indrani Dissanayake, Lanka Jatika Sarvodaya
Shramadana Sangamaya Inc., 98 Rawatawatte Road,
Moratuwa, Sri Lanka

Ms Samiha El-Katsha, Senior Researcher, Social
Research Centre, American University of Cairo, 113
Sharia Kasr El-Aini, Cairo, Egypt

Dr Olfat El-Sebaie, Professor, Department of Environ-
mental Health, High Institute of Public Health,
Alexandria University, Alexandria, Egypt

Ms Chandni Joshi, Chief, Women's Development Section,
Ministry of Panchayat and Rural Development, Shree
Mahal, Jawalabhel, Kathmandu, Nepal

Ms Melanie Katsivo, Medical Research Centre, Kenya
Medical Research Institute, P.O. Box 20752, Nairobi,
Kenya

Dr Komol Sivaborvorn, Sanitary Engineering Division,
Faculty of Public Health, Mahidol University, 421/1
Rajvithi Road, Phayathai, Bangkok 10400, Thailand

Dr Low Kwai Sim, Department of Arts, University of
Malaya, Kuala Lumpur 22-11, Malaysia

Dr Maria Therezinha Martins, Rua Dos Franceses 498,
Ed. Diderot Apto 193, Sao Paulo, Brazil, 01329

Dr Gabriella Castillo Morales, Los Araucanos, 2541-P.
de Valvidia Norte, Santiago, Chile

Mrs Olatokunbo Ogbe, Federal Department of Water
Resources, 43 Bourdillon Road, Ikoyi, P.M.B. 12700,
Lagos, Nigeria

Ms Zeina Raffoul, c/o Prof. Aftim Acra, Department of
Environmental Health, American University of Beirut,
Beirut, Lebanon

Dr Alina Ratto Salazar, CLEIBA, Universidad Mayor de
San Marcos, Apartado 5653, Lima, Peru

Dr Zeinab M. Shahin, National Centre for Social and
Criminological Research, Geizira P.O., Imbaba, Cairo,
Egypt

Dr Sim Suanie, Department of Microbiology, Faculty of
Medicine, National University of Singapore, Kent Ridge,
Singapore 0511, Republic of Singapore

Ms Christina Soedjarwo, Yayasan Dian Desa, 7 km Jalan
Kaliurang, Jurugsari, Yogyakarta, Indonesia

Dr Noerhajati Soeripto, Department of Parasitology,
Faculty of Medicine, Gadjah Mada University,
Yogyakarta, Indonesia

Ms Somchit Tipprapa, Population and Community
Development Association, 8 Sukumvit Soi 12, Bangkok
11, Thailand

Ms Chirati Tingsabadh, Faculty of Social Sciences,
Kasetsart University, Bangkok 10900, Thailand

Ms Elly Utama, Head, Program Development Bureau,
Wahana Lingkungan Hidup Indonesia (WALHI)
(Indonesian Environmental Forum), Jl Suryopranoto 8,
Jakarta 10130, Indonesia

Ms Jacqueline Zambrano, Project Engineer, Empress
Municipal de Alcantarillado (EMAG), 10 de Agosto No.
112, Guayaquil, Ecuador

Philippine Participants

Ms Esther Banzuela, Community Health Worker-Organ-
izer, Lingap para sa Kalusugan ng Sambayanan
(LIKAS), Ground Floor, Colayco Hall, Ateneo de Manila
University, Loyola Height, Quezon City

Ms Mercedes Banzon, Crusade Center for Rural Studies
and Development, 27-D Mayaman Street, UP Village,
Diliman, Quezon City

Ms Maria Cipres, Program Coordinator, Christian
Organization for Rehabilitation and Liberation (CORAL)
Office, AC Bldg., 2215 P. Gil St., Sta. Ana, Metro
Manila

Dr Elvira Dayrit, AKAP, 66 J.P. Rizal, Project 4,
Quezon City

Ms Barbara Escucha, Community Organizers for People's
Enterprise (COPE), c/o Denis Murphy, Office for
Human Development, Dona Matilde Bldg., 2nd Floor,
Apacible St., Ermita, Manila

Ms Tessie B. Fernandez, Chairman, Executive
Committee, Pilipina-Ang Kilusan ng Kababaihang
Pilipino, 102 P. Del Rosario Extension, Cebu City

Ms Ma Josefa Gaspar, c/o Columban Fathers, P.O. Box
1368, Pagadian City

Sr Angeline Lentejas, Franciscan Missionaries of Mary,
Our Lady of Peace and Good Voyage, Poon Bato,
Botolan, Zambales

Dr Methodia B. Mercado, Dean of Graduate School,
Mountain State Agricultural College (MSAC), La
Trinidad, Benguet

Ms Rosa Montevirgen, Rural Waterworks Development
Corporation, 865 E. de los Santos, Quezon City

Ms Gene Peralta, National Environmental Protection
Council, Ministry of Human Settlements, 6th Floor,
Philippine Heart Center for Asia Bldg., East Avenue,
Diliman, Quezon City

Ms Rachel Polestico, Appropriate Technology Center,
College of Agriculture Complex, Xavier University,
Cagayan de Oro

Ms Irene Santiago, Director, Kahayag Foundation,
P.O. Box 208, Davao City

Ms Corazon J. Soliman, Chairperson, Research Training
and Development, Agency for Community Educational
Services Foundation (ACES), #12 Eleventh Avenue,
Murphy, Cubao, Quezon City

Ms Medatrix P. Valera, Research and Development
Unit, Philippine Business for Social Progress (PBSP),
4th Floor Yutivo Bldg., 270 Dasmarinas Binondo, Manila

Observers

Ms Zenaida Austria, Philippine Association of University
Women, 124 Matatag Corner Matulungin Street, Diliman,
Quezon City, Philippines

Mr Carlos Crowe, Water and Sanitation Officer, USAID,
Ramon Magsaysay Center, Roxas Blvd., Manila,
Philippines

Ms Easter Dasmarinas, Program Officer, APPROTECH
ASIA, 4th Floor Yutivo Bldg., 270 Dasmarinas Binondo,
Manila, Philippines

Ms Bep Fritschi, International Reference Centre for
Community Water Supply and Sanitation, P.O. Box 5500,
2280 HM Rijswijk (The Hague), Netherlands

Dr Minerva Inciong, c/o Civil Assembly of Women of the Philippines, 1743 Taft Avenue, Manila, Philippines

Ms Ma Yansheng, Senior Consultant, Family/Child Welfare and People's Participation, United Nations Children's Fund, 866 United Nations Plaza, New York 10017, USA

Ms Mary Ann Maglipon, UNICEF, Neda sa Makati Bldg., Amorsolo St., Legaspi Village, Makati, Metro Manila, Philippines

Dr Mediadora Saniel, Head, Clinical Research Division, Research Institute for Tropical Medicine, Alabang, Muntinlupa, Philippines

Ms Mayling Simpson-Hebert, Visiting Associate, c/o Institute of Philippines Culture, Ateneo de Manila, Quezon City, Philippines

Kabalikat Staff

Ms Cecilia C. Verzosa (Seminar Coordinator)

Ms Marion M. Villanueva

Ms Esther Ceguerra

Ms Cristina Liamzon

Ms Mary Lou Alcid

Ms Ma Cecilia Pabalan

Ms Ma Luisa Nobleza

Mr Crisanto Aure

International Development Research Centre

Dr Donald S. Sharp, Associate Director (Water Supply and Sanitation), Health Sciences Division, IDRC, P.O. Box 8500, Ottawa, Ontario, K1G 3H9, Canada

Mr Lee Kam Wing, Regional Program Officer (Asia),
Health Sciences Division, IDRC, Tanglin P.O. Box 101,
Singapore 9124, Republic of Singapore

Ms Jane MacDonald, Program Officer (Maternal and
Child Health), Health Sciences Division, IDRC, P.O.
Box 8500, Ottawa, Ontario, K1G 3H9, Canada

Ms Goh Lay Chin, IDRC, Tanglin P.O. Box 101,
Singapore 9124, Republic of Singapore

Mr Robert M. Drysdale, Technical Editor, Communica-
tions Division, IDRC, P.O. Box 8500, Ottawa, Ontario,
K1G 3H9, Canada